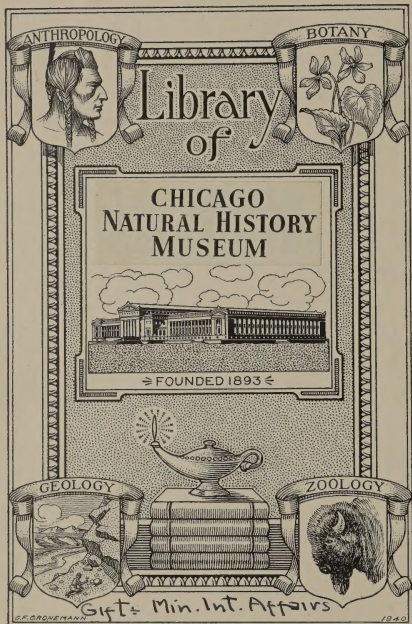
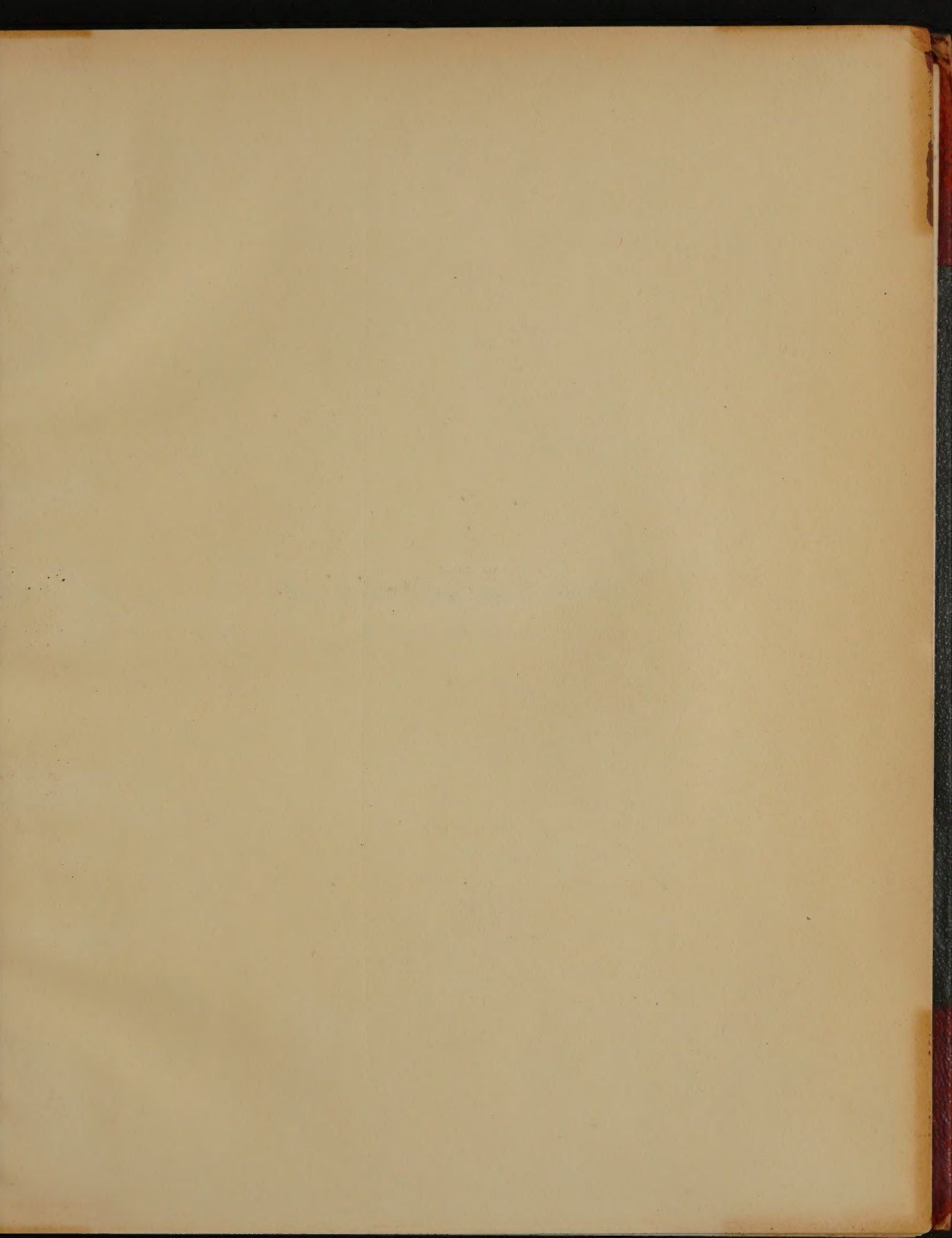


THE BUTTERFLIES
AND MOTHS
OF NEW ZEALAND.





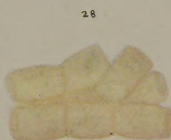
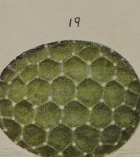
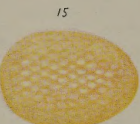
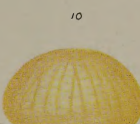
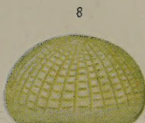
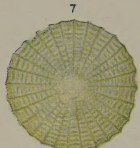
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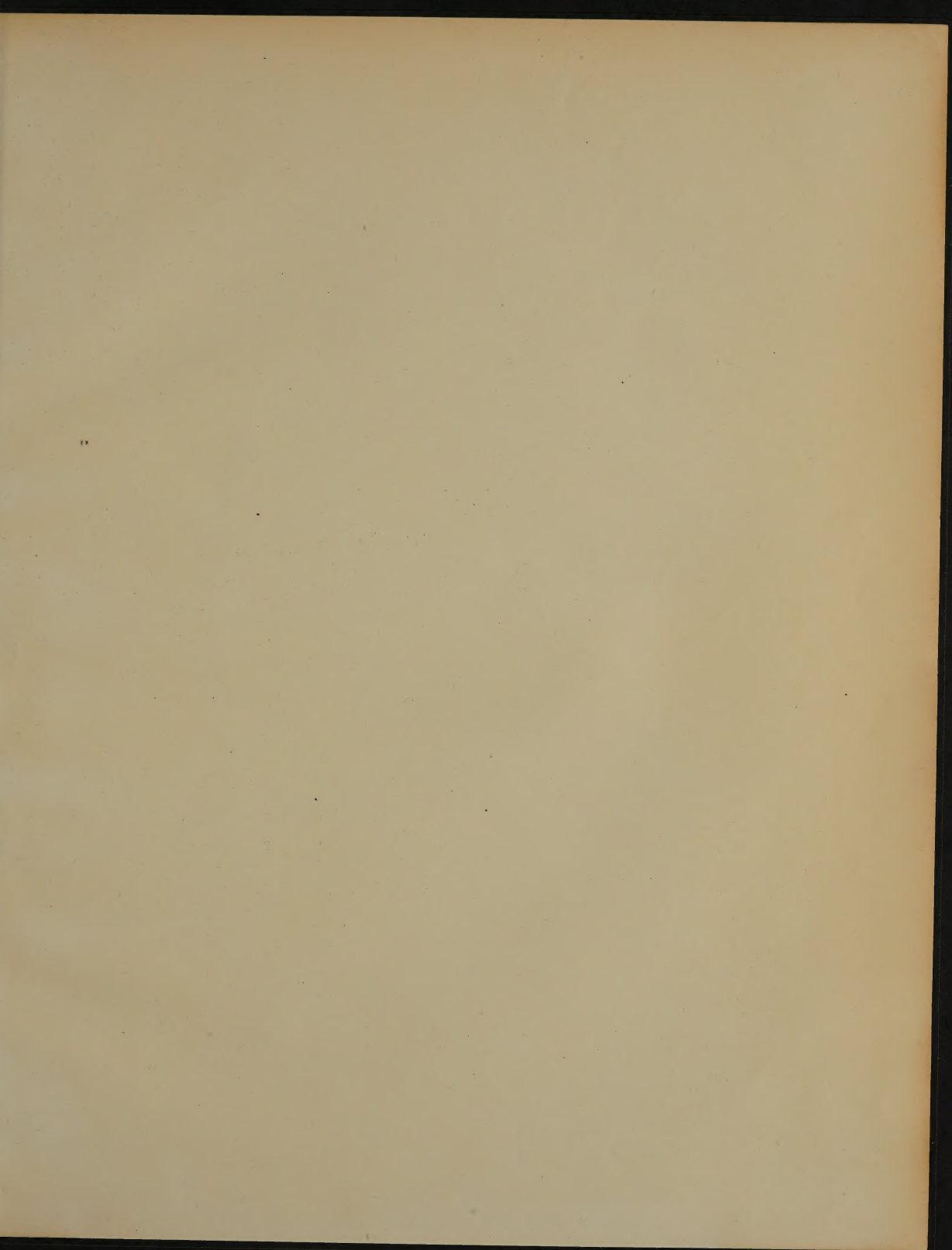
FRONTISPIECE.

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"Nature is a mine of pleasure,—new, boundless, and inexhaustible."

"The naturalist sees life where other men see naught: the woods, the mountain's side, the opening glades, the shadowy burns,—where dwell the new-born butterfly, the gnat, the speckled moth, and the smallest fly; all to him are so many peopled worlds, with customs, habits, and language, of which he alone has the master key."

"When we no longer look at an organic being as a savage looks at a ship, as something wholly beyond his comprehension; when we regard every production of nature as one which has had a long history; when we contemplate every complex structure and instinct as the summing up of many contrivances, each useful to the possessor, in the same way as any great mechanical invention is the summing up of the labour, the experience, the reason and even the blunders of numerous workmen; when we thus view each organic being, how far more interesting—I speak from experience—does the study of natural history become."

CHARLES DARWIN,

In the "*Origin of Species*."

THE
BUTTERFLIES AND MOTHS
OF
NEW ZEALAND

BY

G. V. HUDSON, F.E.S., F.N.Z.INST.

Author of an "Elementary Manual of New Zealand Entomology"; "New Zealand Neuroptera," etc.

WITH 62 PLATES.

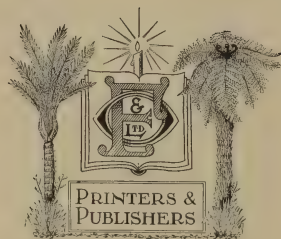
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PREFACE.

SINCE the publication of my book on New Zealand Moths and Butterflies over twenty-seven years ago, there has been a great increase in the number of collectors and students interested in our native Lepidoptera. Amongst these a desire has often been expressed for a work treating of all the species of Lepidopterous insects found in New Zealand, and the present book has been prepared in an endeavour to satisfy this want. Originally the issue of a supplementary volume treating of the smaller moths was all that was contemplated, but it was found that so much additional information had been obtained in regard to the species previously described, and so many new species discovered, that the issue of a complete work covering the whole order was the only satisfactory method of dealing with the subject.

The purely descriptive portions of the work have been made as brief as possible, and in order to appeal to a wide circle of readers, all unnecessary technicalities have been avoided. In every case where the desired meaning could be clearly conveyed by words in ordinary use, these have been employed in preference to technical scientific terms. Highly specialized accounts of individual species would be out of place in a work of this kind and have not been inserted, but references to such accounts, when published, are given under their respective headings.

The systematic portions of the work have, of necessity, been almost entirely founded on Mr. Meyrick's descriptions of genera and species of New Zealand Lepidoptera, which have appeared in the Transactions of the New Zealand Institute and elsewhere during the last 44 years. These very valuable contributions to Science have afforded me indispensable aid, and have been freely made use of. I am also greatly indebted to the same author for assistance in the identification of species, and for much information on questions of Geographical Distribution.

Mr. Alfred Philpott has supplied me with a great number of very rare, and in some cases, unique specimens of Lepidoptera acquired by him during thirty years entomological work in Southland. He has also most generously placed at my disposal his extensive observations on the Natural History of the Lepidoptera of that interesting region. Since his transfer to Nelson, in 1920, he has continued to render much valuable assistance.

I am much indebted to Dr. J. Allan Thomson, the Director of the Dominion Museum in Wellington for the opportunity of figuring many valuable specimens contained in the fine collection of Lepidoptera in his charge, and to Miss Castle for assistance in connection therewith; also to Professor Speight, of the Canterbury Museum, Christchurch, for the loan of many specimens from the Chatham Islands and other valued help. Messrs. Charles E. Clarke, H. Hamilton, W. G. Howes, C. Lindsay, S. Lindsay, F. S. Oliver, R. M. Sunley, Morris N. Watt, E. S. West, and others, have likewise assisted by allowing me to figure many rarities contained in their collections. Mr. L. B. Prout has furnished valuable information in connection with the Geometridae.

Sir George Hampson, formerly of the Entomological Department of the British Museum of Natural History at South Kensington, has furnished some interesting particulars in connection with the collections of New Zealand insects which were made during the very early days of the Colony.

"Hillview,"

Karori,

Wellington, New Zealand, 1927.

G. V. HUDSON.

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HISTORICAL SKETCH.

THE EARLIEST collections of New Zealand insects were made by the naturalists who accompanied Captain Cook in his first and second voyages round the world. In the first voyage, 1769-70, Sir Joseph Banks brought home a few insects, and these were described in 1774-75 by Fabricius. Hence it happens that our two most familiar butterflies, *Vanessa gonerilla* and *Chrysophanus salustius*, were named by that old-time naturalist. In 1840 Dr. E. Dieffenbach travelled through the North Island of New Zealand and the Chatham Islands. His collections were described by Dr. J. Gray and Dr. Richardson. In the appendix to the account of Dieffenbach's travels, Dr. Gray, Director of the British Museum, gave a list of the New Zealand Lepidoptera then known.

In 1841 H.M.S. "Erebus" and "Terror," under the command of Sir James Ross, visited Campbell Island, the Auckland Islands and the Bay of Islands. Some of the Lepidoptera were described by Mr. A. White in 1846, but publication was then interrupted for want of funds, until 1874, when the rest of the Lepidoptera were described by Mr. A. G. Butler, of the British Museum.

Between 1845 and 1860 collections made by the following local naturalists were sent to the British Museum and the Lepidoptera were described by Mr. F. Walker and Mr. A. G. Butler, chiefly in publications issued by the Museum.

1845—Earl, North Island.

1847—Dr. Andrew Sinclair, R.N., Auckland.

1851—Churton.

1853—Rev. W. Colenso.

1854—Colonel Bolton, Auckland.

1860—Oxley, Auckland.

In connection with these very early collections it is of interest to record that the original specimens, from which Doubleday named and described our well-known butterfly, *Argyrophenga antipodum*, "were obtained by Mr. P. Earl, who discovered them on a plain in the southern island of New Zealand." The first specimens of *Chrysophanus boldenarum*, which were sent to England, and from which White named and described the species in 1862, were discovered by the Rev. W. Colenso in 1853.

In 1859 the Austrian frigate "Novara" visited New Zealand, and a considerable number of species of Lepidoptera then discovered were described by Felder and the descriptions published in Vienna in 1864-69.

In 1862 Mr. R. W. Fereday arrived in New Zealand and settled in Canterbury. He assiduously collected Lepidoptera, chiefly in the South Island, and discovered a great

many of our species. Mr. Fereday was much assisted in his entomological work by Mr. J. D. Enys, of Castle Hill, who discovered, amongst many other things, both our alpine butterflies, *Erebia pluto* and *Erebia butleri*. *Erebia pluto* was briefly described and named by Mr. Fereday in 1871, and *Erebia butleri* described and figured by him in 1879. In 1880 Mr. Enys issued an illustrated catalogue of New Zealand butterflies. After Mr. Fereday's death in 1899, his entomological collections were acquired by the Christchurch Museum, but unfortunately the original labelling of the specimens has been very much altered, and the collection thus deprived of much of its historical and scientific value.

From about 1870 until about 1888 Mr. R. Helms industriously collected insects in the neighbourhood of Greymouth. At that time the entomology of the West Coast of New Zealand was practically untouched, and as a result Mr. Helms was responsible for the discovery of many very striking species, especially amongst the Coleoptera, to which he was principally devoted. His most important discoveries amongst the Lepidoptera were *Titanomis sisyrota* in 1874, and *Dodonidia helmsi* in 1881.

In 1879 Mr. E. Meyrick visited New Zealand and collected and described Lepidoptera with great energy at intermittent periods until his final departure for England in 1886. Since that time he has continued to describe numerous species forwarded to him by local naturalists and his papers in the Transactions of the New Zealand Institute and elsewhere, extending over a period of more than 44 years, constitute by far the most important contributions to Science on the subject.

From 1890 until 1920 Mr. Alfred Philpott collected and investigated the Lepidoptera of Southland, and has described many new species in the Transactions of the New Zealand Institute. It is to his energy and acumen that we are indebted for a knowledge of certain difficult, but distinct species, which have eluded the notice of other observers. Since 1920 Mr. Philpott has studied the Lepidoptera of the Nelson district.

In 1907 the late Mr. Augustus Hamilton inaugurated the formation of a very valuable collection of Lepidoptera, for the Dominion Museum at Wellington, which has very materially extended our knowledge. In this undertaking he was assisted by Mr. Harold Hamilton, Mr. W. G. Howes, Mr. F. S. Oliver and others.

In 1899 the author's first book on New Zealand moths and butterflies appeared, of which the present work is a revised and greatly extended edition.

CHAPTER I.

ON VARIOUS MODES OF COLLECTING AND OBSERVING
BUTTERFLIES AND MOTHS IN NEW ZEALAND.

It may be safely said that, in the great majority of cases, an interest in Natural History is first awakened by a desire to collect specimens, and the experience gained in making such a collection very often forms the starting point for more serious scientific investigations. It therefore appears appropriate to deal with the questions of collecting and observing in the same chapter, and it is in fact often very difficult to draw any definite line between the two activities.

The first requisite for the collector of insects is a reliable net. For the purpose of catching butterflies and moths the ordinary cane ring net is the most suitable and may be constructed as follows:—

First procure a strong forked metal tubing shaped like a Y; the large tube is to receive the end of an ordinary walking-stick and the two smaller tubes the ends of a cane which is bent round in the form of a hoop. A bag is then made of green lino, or mosquito net, sewn to a stout hem of stronger material threaded on to the cane ring, thus completing the net. The bag should be made about 2 feet 6 inches deep with the bottom angles well rounded off, so that captured insects cannot retreat into the corners and damage themselves in their efforts to escape. The fold of the seam of the net should always be kept *outside*. This is very important as small insects get in beneath the folded seam and become damaged. When working on a mountain, or in any other remote locality, it is well to have a duplicate net-bag available in case of accident. At all events a needle and cotton should be carried so that any tear may be repaired on the spot. A good stout stick is an indispensable adjunct to the net, and is used to beat foliage, in order to dislodge any specimens resting amongst the leaves, or on the twigs. A stout manuka stick, about five feet long, makes an admirable beating stick, and is also a great help to the entomologist when travelling over rough country. As a rule it will be found convenient to keep the net in readiness in the right hand, retaining the beating stick in the left. Moths may often be dislodged from small trees by giving the trunks one or two sharp kicks with the heel, and this method will be found very useful in those cases where the beating stick cannot be brought into effective operation. Wood-borers, when first emerged, may often be dislodged by beating dead branches over a net or umbrella.

The umbrella net, which may be purchased from any dealer in entomological apparatus, has the advantage of extreme portability, and is most useful for collecting in the immediate vicinity of towns. The stick, which crosses the opening of the net, is liable to injure any specimen which it happens to strike, but as most of the New Zealand species are small in size, this risk is insignificant and may be disregarded. A sweeping net, made on the same principle as the umbrella net, is also a most useful adjunct. This class of net is swept indiscriminately through foliage, blossoms or grasses, and by its means some minute specimens of moths may be taken which would be difficult or impossible to obtain by any other method. It is also invaluable for the collection of larvae. The net should, however, be examined and cleared every two or three sweeps, otherwise the specimens will be damaged amongst the accumulation of dead leaves and refuse.

When a rapid flying insect is fairly in the net, the handle must be immediately turned with a sharp motion of the wrist, so that the bag falls over the edge of the ring and thus prevents the captive's escape until it is safely "boxed." The best boxes for this purpose are metal boxes with glass lids. As soon as the insect has ceased fluttering, one of these boxes, of suitable size, should be carefully placed over it, the net being tightly drawn over the opening of the box, and the lid adroitly slipped on, when the closed box containing the insect may be withdrawn from the net. In this way the collector will soon become expert in boxing specimens caught in the net, and it is almost needless to say that a capture must never be touched with the fingers. Lepidoptera may also be boxed whilst at rest on blossoms, tree trunks or palings, and many valuable notes made at the same time, as to the nature of the various kinds of protective colourings and rest attitudes adopted by the different species, in order to elude their various enemies. The position of any mutilations in the wings observed in specimens taken in their natural surroundings should also be carefully noted. In addition the observant collector will record the relative abundance of the various species, which often vary greatly from year to year. He will also note the class of localities frequented by each, their manner of flight, courtship and any other point of special interest. The preference of any species for special blossoms or plants should also be recorded, especially in respect of those species whose life-history is unknown. It is, perhaps,

almost unnecessary to add, that every observation should bear both the date and the name of the place where it was made. Incidentally, it may here be mentioned, that a pencil and notebook as well as a good lens, magnifying about six diameters, should invariably be carried by every entomologist when at work in the field. The glass-topped boxes used for collecting should be of various sizes, the most useful being 1 inch, $1\frac{1}{4}$, 2 and $2\frac{1}{4}$ inches in diameter. These may be carried in nests of four, about twelve nests or say fifty boxes being a fair supply for a day's work. They may be placed in a satchel which must have at least two divisions, one being used for empty boxes and the other for full ones. An interim supply of, say a dozen boxes, should be "unnested" and placed in the pocket for immediate use; the empty boxes in the right-hand pocket and the full ones in the left. Unless some such fixed rule be invariably followed, captured insects will sure to be inadvertently liberated in the excitement of the chase.

On arrival home at the end of the day's work, the collector's next step is to kill his captures. For the smaller species, except those having vivid green colouring, a laurel bottle is suitable. This is made of a wide-mouthed bottle, provided with a tight-fitting cork or glass stopper. Some young laurel shoots should be obtained, about the second week in October, cut up into small pieces, and well bruised with a hammer, or between two stones. The laurel should then be placed in the bottle and well pressed down so that about a third of the bottle is filled. A disc of cardboard, cut to fit the inside of the bottle, must then be firmly pressed down over the laurel leaves, so that they will not move when the bottle is inverted. The specimens, which will usually be found resting quietly in the boxes, may be transferred to the killing bottle, by sharply tapping the opened box on the edge of the mouth of the bottle, but, if possible, this should never be done at an open window as, even with the utmost care, the occasional escape of a specimen is unavoidable. For larger insects, or any having a green shade in their colouring, chloroform must be employed as a killing agent, and a suitable bottle for its application, may be constructed as follows:—

Procure a wide-mouthed glass jar, with a metal screw top, the screw top being furnished inside with the usual cardboard disc, which may be supplemented by the insertion of several similar discs of blotting paper, a piece of sponge, about the size of a large pea, should be firmly attached, by means of a fine wire, to the cardboard in the screw top. This sponge is intended to receive three or four drops of chloroform, which is thus kept from direct contact with the specimens in the jar. At the bottom of the bottle itself, a much larger sponge an inch or two in diameter, partially saturated with water, is placed, the remaining space in the lower portion of the jar being subsequently filled up with cotton wool, and the whole held compactly down by means of a tight-fitting cardboard disc. Insects

killed in a bottle of this design, will be fairly well relaxed in about 12 hours, when they are almost as easy to manipulate as those killed with laurel. All killing bottles require to be dried when moisture accumulates on the glass. The stock of chloroform should be kept in a small glass stoppered bottle. Except in the case of a very rare species, no damaged specimens should be killed and few collectors will desire to sacrifice an insect's life, unless the specimen can afterwards be profitably utilised for scientific work. Some collectors use cyanide of potassium for killing their captures, and specially prepared cyanide bottles can be purchased from dealers in entomological apparatus. Others kill and pin their specimens in the field, thus dispensing with the need for carrying a supply of boxes. I am, however, unable to recommend this procedure as time in the field is often extremely valuable, and the pinning of small species, under the conditions there existing, is liable to be attended with much difficulty.

From killing we must now pass to the question of pinning. Special entomological pins of different sizes, silvered, gilt or black, may be purchased from all dealers in entomological apparatus. For New Zealand work, sizes 1, 4, 5, 9, 10, 17 and 19 will be found the most convenient, and gilt pins are recommended. For insects about the size of *Vanessa gonerilla* and average *Noctuids* No. 4 is suitable; No. 5 is useful for such insects as *Argyrophenaga antipodum* and average *Geometers*; *Scoparias*, *Tortrices* and the larger *Tineids* should be pinned with No. 9 or 10; the smaller *Tineids* with No. 17 or 19. The very minute moths should, however, be impaled with special pure silver pins, and finally mounted on a piece of pith, which is in turn pinned into the cabinet or store-box with an ordinary No. 5 entomological pin. Suitable cylinders of pith, which should be cut about $\frac{1}{2}$ -inch long, may be obtained by carefully peeling stout rushes, the inside pith being well dried either in the sun or before a fire. In all cases the pin must be placed exactly through the middle of the thorax. It should be absolutely at right angles to the long axis of the insect's body, leaning neither to the right nor to the left, and should project fully $\frac{1}{3}$ inch beneath the specimen. It is a great mistake to pin a large insect with a very fine pin, or a small one with too heavy a pin, and on this account the collector should always keep on hand a good stock of pins of the various sizes mentioned. A very convenient pin tray, with six divisions for pins of different sizes, is supplied by dealers in entomological apparatus, and will be found invaluable. Except in the larger species, pinning is best effected under a magnifying glass of low power. The "speera-binocular magnifiers," supplied by Messrs. Watson and Sons, of 313, High Holborn, London, will be found invaluable when pinning and setting minute insects. They are worn like spectacles, thus leaving both hands free for work. A pad of rough cloth is useful to pin insects on, and its thickness may be varied to regulate the height at which they are pinned.

As soon as the specimens are pinned, they must be placed in a relaxing box. This is an oval zinc box, lined with cork, which has been thoroughly damped. In hot weather, specimens should only be kept in the relaxing box about 24 hours, but in colder weather this may be extended with advantage to two or three days. When the insects are properly relaxed the next step is to set them. This is effected by means of various sized corked boards, provided with grooves for the reception of the insects' bodies. The depth of the groove is varied according to the height at which the collector desires his specimens set, the modern tendency being in favour of high setting, which, if carried out within reasonable limits, is a distinct advantage. The wings are spread out in a symmetrical position, and retained in their places by means of strips of tracing cloth transfixed with pins, the anterior legs and antennae being appropriately arranged at the same time, and also fastened by means of pins and small pieces of tracing cloth or card. A fine needle, mounted in a bone handle, known as a setting needle, will be found useful, also a small sharp-pointed pair of scissors, a fine pointed pair of tweezers and a pair of entomological pinning forceps. These may all be obtained from the dealers and are indispensable. The wings should be moved by very gently pressing the setting needle behind one of the main veins, near the base, and every care taken to avoid piercing the membrane of the wing, or removing any of the scales. When the body of the insect has a tendency to sink too deep into the groove, it should be supported by means of small wad of cotton wool, and the same adjunct is often useful in adjusting the positions of legs and antennae. Plate IV., fig. 8; Plate IX., figs. 6 and 7; Plate XVII., fig. 25; Plate XXII., fig. 3; Plate XXIII., fig. 11; and Plate XXXIV., fig. 20, may be taken as typical of well set specimens belonging to different families. In hot, dry summer weather, ordinary specimens of Lepidoptera, stiffen in about a fortnight, and can then be removed from the setting board, but a longer period is often necessary, if the weather be cold or damp. The utmost care must be taken not to remove the insects too soon, otherwise the wings will sag, and the best setting be completely spoilt. If insects from different localities are set on the same board, each locality should be briefly indicated in pencil alongside the respective specimens. Setting boards are best placed in well ventilated boxes, provided with battens for holding the boards firmly in one position. These are called drying houses and, if fitted with suitable handles, are most convenient to the entomologist when travelling. The art of good setting is difficult to master and often tedious to carry out, but there is no question that, from a purely scientific, as well as from an aesthetic point of view, a well set specimen is of much greater value than a badly set one. Now that photography plays such an important part in the illustration of entomological subjects, the need for good setting is even greater than before.

From the setting board the specimens must now be transferred to a store box, care being taken that insects from different localities are kept separate, so that the date of capture, locality, and other particulars can be accurately recorded before they are finally placed into the main collection. Most entomologists write or print the date of capture and locality on a small paper or card label, which is placed on the pin beneath the insect. This is a most convenient method, its only drawback being the exceeding brevity of the information which can be recorded on so small a label. Another system is to give each species a number and each specimen a letter; full particulars in respect of every specimen being recorded in an indexed book or a Collection Journal. Thus *Vanessa gonerilla* would bear, say No. 6, and the first specimen taken, say at Nelson, a label "6a," the second captured at Wellington "6b" and so on. The labour involved under this system is very great, but a large amount of valuable information is summarized under each species in regard to the times of appearance, nature and altitude of country frequented, and habits, which is not available under the system of merely labelling specimens with a ticket giving locality and date of capture. Again, if an unknown species is taken, it is at once numbered, and if more than one specimen is found, a duplicate bearing the same number can be sent away to some other entomologist for identification. I adopted the book system for my collection over forty-six years ago and have found it very useful, although at times somewhat laborious. I would, however, advise beginners at the present time to adopt the plan of attaching locality labels to their specimens, but in addition to doing so a card index should be prepared for the whole collection. For this purpose about 1500 printed cards must be obtained, similar to the accompanying pattern, the intention being to allot a separate card to each species as it is added to the

Name and Reference
Localities
Time of Appearance
Class of Country where found
Food Plant
Habits
Miscellaneous

collection. Guide cards should be inserted for each genus, and the whole series of cards kept in systematic order. Such an index would become invaluable as the collection increased in size, and could be used for scientific investigation in many different ways. For example, if a list of the Lepidoptera inhabiting any given locality were

required, or the number of species, the cards relating to each species found in that locality could be quickly taken out of the series, and the required list at once compiled. Again it might be desired to ascertain the species occurring during certain months in the year, and this information could be immediately obtained by a reference to the cards. A list of the species attached to any particular plant, or class of country, could also be arrived at in a similar manner.

In the case of new species it is important that the type specimen, from which the original description, or figure, has been prepared, should be known with certainty. To secure this every such specimen should be labelled "Type," and the name of the insect and initials of describer added. Some authors call the original type specimen the holotype, and the first specimen described of the opposite sex the allotype. The term paratype may be applied to any other specimens before the describer at the time of making out the description.

The question of a suitable entomological cabinet is mainly one of expense, but the young collector will do well to use every effort to obtain a thoroughly good cabinet from the best maker, as the labour entailed in making a good collection is so great, that any failure to adequately house and preserve it will ultimately prove the reverse of economy. Specimens are finally arranged in rows in the cabinet drawers, the name of the genus being at the head of each row and the name of the species under each series of specimens belonging to the same species. The exact method of arrangement may at once be seen by referring to any standard entomological collection in our principal museums. To facilitate necessary alterations in arrangement, it is very desirable that all cabinet drawers should be made interchangeable. Unless provided with special camphor cells, each cabinet drawer should have a piece of camphor securely pinned in one corner. It is also necessary to fumigate the entire collection, at least twice a year, in order to guard against the ravages of "mites" (*Psoci*) and mould. For mites a mixture of equal parts of oil of anise, oil of thyme and spirits of wine, placed on a pellet of wool in a watch glass in each drawer, will be found effective and pleasant to use. For mould, pure glacial carbolic acid should be employed; the bottle containing the frozen acid must be put in hot water, and a small quantity of the melted acid placed on cotton wool and applied in the same way as the aniseed preparation. Camphor should, however, always be removed from any drawer which is being fumigated with carbolic, otherwise it will partially liquefy and spoil the paper lining of the drawers. Mould may be removed from infected specimens by the careful use of methylated spirits, which must be sparingly applied with a camel-hair brush.

Every entomologist should keep a diary in which he can record any observations made on insects during his rambles. Also particulars in regard to life histories

presently to be described. The diary should be indexed at end of each year so that any information contained in it can be immediately found.

The best localities for entomological work in New Zealand are those situated away from settlement and of a diversified character. A combination of mountain, forest, river-bed and tussock land is, of course, excellent, and any one of these classes of country is well worth working if untouched by cultivation. A few species also frequent the sea coast, but the sea is not an important feature as far as the Lepidopterist is concerned. Chapter III., dealing with the habits of the Lepidoptera, will give the reader a fair idea of the class of country where he is likely to obtain the best collecting.

With regard to the best special localities there can be no doubt that, generally speaking, the South Island is very much richer in species than the North Island. All mountains over 3,500 feet in elevation are deserving of special attention, as we here find the very numerous and peculiar alpine and sub-alpine forms not procurable on the lowlands. Mountains rising out of dense forests, such as those extending along the West Coast of the South Island, are always very productive. Of special localities in New Zealand, suitable for collecting, the following may be mentioned as likely to yield interesting results, at the proper season, and under favourable weather conditions:—

- (1). The forest districts North of Auckland.
- (2). The forests and the tussock plains of the central plateau of the North Island, (Waiouru, Ohakune, Waimarino; also Mount Ruapehu).
- (3). Mount Egmont. Personally I have found this isolated mountain very unproductive.
- (4). The Tararua Ranges North of Wellington.
- (5). The Chatham Islands.
- (6). The Tableland of Mt. Arthur. (Probably one of the best entomological localities in New Zealand at present known).
- (7). The Dun Mountain and other ranges East of Nelson.
- (8). Arthur's Pass and the Otira River. (A very fine and most accessible locality).
- (9). The ranges and glacial moraines around the Mt. Cook Hermitage. (Another very fine locality but imperfectly worked at present).
- (10). The whole of the Lake Wakatipu region around and beyond Queenstown. (This is a well-worked but excellent district).
- (11). The country around Invercargill, especially the numerous patches of forest which remain intact.
- (12). Seaward Moss near Awarua Bay, Invercargill. This fenland has produced several very interesting species, which are either very scarce, or not found elsewhere.
- (13). Orepuki, including Longwood Range, The Hump and the country around.

- (14). The Hunter Mountains, North of Lake Monowai.
- (15). The Takitimu Mountains, opposite the Hunter Mountains and East of the Waiou River. Both these are excellent localities for Southern and Alpine species, and have yielded many novelties.
- (16). Stewart Island. Although the coastal insects are, generally speaking, the same as those found on the mainland, the higher portions of the Island yield special species, some of which have not occurred elsewhere.*
- (17). The outlying islands to the South of New Zealand. These have been most imperfectly worked at present and many novelties, no doubt, await the enterprising collector.

There are also many localities which have not yet been visited by entomologists, especially in the North East portion of the North Island, and in the more inaccessible regions in the extreme South West of the South Island. In the last-named mountainous and imperfectly explored area it is almost certain that many new and interesting species still remain to be discovered.

The best months of the year for collecting in the lowlands in New Zealand are November, December, January and February; December being probably the best of all, as the greatest number of species are then to be met with in a fresh and perfect condition. For mountain work, and for collecting in the extreme south of the South Island, the best season may probably be fixed nearly a month later. Other months, extending from August till May, should not be neglected, as they each produce a few special species, not found at other times, and even in the depth of winter useful observations may be made on larvae and hibernating species, so that the collector, or observer, may do a certain amount of good work in the field during fine weather the whole year round. Too much stress cannot, however, be laid on the fact that, so far as the Lepidoptera are concerned, the best results are always obtained during the earlier part of the season. Before the 1st January nearly every species, then on the wing, is in a perfect condition, and a greater proportion of species emerge from the pupa in November and December than at any other time of the year. After the end of January the collector will find insects scarcer and that many of his captures are in poor condition, causing much loss of time and disappointment. The fact that the best weather is nearly always experienced *after* the summer solstice, is liable to produce an impression that collecting can be pursued with greater effect at that time than earlier in the year. A prolonged experience, however, refutes this idea, and the young collector will do well to seize every available fine day in late spring and early summer, seeing that one day then will yield better results than three or four of the best days in the late summer or autumn. Some

species are on the wing for a very short period, and this often explains their apparent rarity.

Any specimens taken in copulâ should always be very carefully preserved and labelled as male and female taken *in copulâ*. Besides affording conclusive evidence concerning the characters of the sexes of the same species, this procedure will ultimately result in extensive evidence being available as to any sexual preference which may exist between individuals belonging to the same varietal forms. Such evidence is at present very meagre, but it is much required for the elucidation of several important scientific problems.

Forest collecting is best pursued by following up a good track, or watercourse, and vigorously beating the foliage on either side, the insects are then netted as they fly out. The dead fronds which accumulate around the stems of tree ferns are extremely productive, and should be well disturbed with the beating stick whenever they are met with. On tussock or open mountain country, the moths usually rise on the approach of the collector, and as many of the species found here are rapid fliers extreme alertness is essential to success. Fine calm weather is, however, indispensable for working open country. Glades in scrub, open to the late afternoon sun, are often extremely productive in small lepidoptera, as well as wind swept hill-tops, when the weather is exceptionally sultry.

During the dusk of evening most species of moths visit the flowers to feed on the honey, and may often be successfully boxed with the aid of a lantern. The lantern should, however, be securely fastened to a strap and suspended around the collector's neck or waist so that both hands may be left free for capturing the insects. The most suitable blossoms for night collecting are those of the various species of Veronica, White Rata, Red Rata, Scabious, and Ragwort. When blossoms fail, recourse must be made to "sugaring." To do this it is necessary to obtain some black treacle and some rum which should be well mixed in the proportion of about four tablespoonfuls of rum to an ordinary tin of treacle. About sunset the collector will spread this mixture with a brush on tree trunks, palings, or other objects which can be conveniently examined after dark by the aid of a lantern. On some nights, especially in the late autumn, the sugared trees will be found swarming with the commoner species of *Noctuidæ*, whilst on others few, if any, will be attracted. As a rule sugaring is one of the most effective methods of night collecting on open grassy country, and many species of *Noctuidæ* can be obtained by this method which cannot be allured by any other means.

That moths and other nocturnal insects are attracted by light is a fact familiar to most people, but the experienced collector desires to turn this habit to good account. To do this effectively much depends on the surroundings of the collector's residence, and if his house happens to have a window facing an extensive area of virgin forest or

* I am indebted to Mr. Philpott for information in regard to localities numbered 11 to 16 inclusive.

swamp, valuable results may be reasonably anticipated. If practicable, a powerful lamp should be exhibited immediately outside the window of the collecting-room, as this has a very extensive range, and another lamp placed on a table just inside the window. The usual accessories—net, bottle, pins, &c.—should, of course, be easily available. With regard to the most suitable times for lighting up, I cannot do better than quote from Stainton:—

“Next, two particular points have to be borne in mind—First, you cannot collect by light on bright moonlight nights; you must notice when the moon rises and sets, and light up accordingly. Second, you cannot collect by light if your window faces the wind, for moths fly against the wind, and if the wind is west you must put your light on the east side of the house, or if the wind is east you must have your attracting-room on the west side of the house. Moths begin to come to light as soon as it gets dark, and continue coming for some time—indeed, occasional stragglers will come throughout the night; the collector might therefore, with advantage, remain in his collecting-room till daybreak, ready to secure every specimen the moment it appeared, for some only remain for a short time in the vicinity of the light and then fly away, and others, which remain quietly enough half the night, fly away before daybreak. However, if the collector does not wish to sacrifice his whole night’s rest at the shrine of science, let him go to bed about midnight, and let him revisit his collecting-room an hour or two before daybreak to secure any specimens which have come in during the night. On some nights moths come veritably in troops to the light—*Noctuae*, *Geometrae*, *Pyrales*, *Tortrices*, and *Tineae*—it is a mad race which shall come in; but these gala nights are very scarce—sometimes there will not be above three such nights in a year. And here is shown the necessity for the collector, who wishes to attract insects by light, to attend systematically, for the good nights cannot be distinguished by our senses from the bad ones, and if he only lights up now and then, instead of regularly, he will be almost sure to miss the good nights. I once knew a continuous fortnight of good nights. When the small *Psychodae* come in great numbers, so as to blacken the windows and ceiling of the collecting-room, it is almost an infallible sign that the moths are coming in numbers.”

Having considered some of the best methods for the collection and observation of the perfect insect, we will now turn to the scarcely less important question of the rearing of larvae. It was well remarked by Dr. H. G. Knaggs that “‘breeding’ is perhaps the most deeply interesting of all the charming occupations to which the student of entomology is liable; for whether we regard it from an instructive point of view, or pursue it from the simple love of contemplating creation’s wonders, or whether we have an eye merely to quantity and quality of specimens, it is in any case an equally profitable employment.”

To obtain a full knowledge of any insect’s economy we must start with the egg. Although eggs of certain com-

mon species of Lepidoptera may sometimes be found at large, a much simpler and more reliable method of obtaining them is to capture a female moth or butterfly, and endeavour to induce her to deposit her eggs in captivity. For this purpose a somewhat worn specimen is preferable to a fresh individual, as the chances are that the eggs from a fairly old female will have been fertilised. Some species can of course be induced to pair in captivity when fertile ova will naturally result. In the case of most female moths eggs may be obtained by simply enclosing the insect in a large chip box with a little honey, but an additional inducement may be offered by introducing a leaf of the foodplant as well. Butterflies are much more difficult to manage in this respect, as they require sunshine, and if this be admitted into an unventilated box a speedy death of the inmates will ensue. It is, however, occasionally possible to follow up and watch a female butterfly depositing her eggs in the open, when the collector can of course afterwards secure them. I have often observed *Vinassa gonerilla* engaged in laying her eggs on stinging nettles and subsequently found the eggs.

For rearing young larvae just out of the egg, or the larvae of minute moths, the largest size (three inches in diameter) glass topped boxes are very suitable. The chip box, in which the female has laid her eggs, can be broken up and the portions to which the eggs are attached placed in the glass topped box and carefully watched. If unknown or imperfectly described, the egg should be viewed under a suitable magnifier and a description made, and the same procedure followed in regard to the larva. As soon as the eggs hatch a few leaves of the food plant must be introduced. If the food plant is unknown, the habits of the allied species should be looked up, and a food plant supplied which is likely to be correct. A special note should always be taken as to whether the young larvae eat their eggshells. In about three weeks’ time the larvae will probably be large enough to transfer to a breeding cage. Suitable cages may be obtained from the regular dealers, or they may be constructed by the collector. They should be of various sizes, according to the number of larvae to be reared, and provided with fine gauze or perforated zinc ventilators. Sufficient glass should be employed in their construction to admit of a full view of the interior, and all openings must, of course, be securely closed in order to prevent the escape of any larva. A sprig of the food plant should be supplied, fixed in a bottle of water, and a small stone ink bottle is very suitable for this purpose. It should be well plugged around the stem of the food plant, so that the caterpillars cannot crawl down into the water and drown themselves. The habits of all larvae under observation, especially if not previously known, should be carefully recorded in the entomological diary. Also their appearance described, if possible, at each moult.

A great many larvae bury themselves in the earth, prior to undergoing their transformation into the pupa, and it will therefore be necessary to place a shallow jar of earth

in the breeding cage, before the larvæ are quite full grown. Larvæ which hibernate during the winter are the most difficult of all to successfully rear in captivity, and in such cases the observer must use his ingenuity in reproducing, as far as possible, the conditions under which the larvæ spend the winter months when in their natural surroundings. Except in the case of species whose life histories are already well known, different kinds of larvæ should always be kept in separate cages, and a small card enclosed in each cage giving the date and a reference to the page in the diary where the description and account of the habits of the larvæ appear. Unless this be systematically done, there will often be serious difficulty in correctly assigning a larval description, or drawing, to the perfect insect which has actually resulted from the larva. In many cases Lepidoptera remain in the pupa state for some months during the winter and, unless special precautions are taken, the observer will be very liable to forget about the larvæ he had under observation the previous autumn. From personal experience extending over many years, I can strongly recommend the system here described as being much more convenient and accurate than the older system of keeping a numbered list of breeding cages with their inmates. By using the cards, the observer can constantly change his larvae or pupae, from one cage to another, provided he always changes the cards with them, and as every breeder

of insects is well aware, such changes frequently have to be made in order to provide accommodation for fresh batches of larvæ as they come to hand. The importance of providing for the certain identification of larvæ, with their relative perfect insects, has been insisted on at some length, as so many cases have occurred where collectors have bred species of the greatest interest, but have afterwards been unable to furnish any information as to their life histories.

Quite apart from the discoveries of new life histories, information of great scientific value can often be obtained by an observant breeder of insects, and the following may be specified as examples:—The inheritance of remarkable individual variations from parent to offspring; the influence of different food plants, environments and temperatures on the resultant perfect insects; the existence of seasonal variations; the precise nature and meaning of the protective coloration, structure and instincts of larvæ; etc., etc.

When breeding large numbers of individuals of one species, an exact record of the number of each sex bred is of great value and should always be kept. Until such records are more generally available, the precise proportion of male and female individuals in different species of insects cannot be accurately determined, although there are good reasons for considering that, in most species of Lepidoptera males are more numerous than females.

CHAPTER II.

ON THE GENERAL CHARACTERS AND STRUCTURE
OF THE LEPIDOPTERA.*

Butterflies and moths together form one of the great orders of insects termed *Lepidoptera* (from the two Greek words *λεπίς* a scale, and *πτερόν* a wing), of which the most striking character is that the wings are clothed with scales. The mouth of these insects is suctorial, the maxillæ forming a spiral proboscis which is coiled up between the large labial palpi when not in use (see Plate B, figs. 5 and 6). The other oral organs are rudimentary. To acquire this form these insects pass through three very distinct stages, viz., the Egg, the Larva, and the Pupa.

The eggs of *Lepidoptera* are generally somewhat globular, much flattened above and beneath. (See frontispiece.) Some are very elaborately sculptured, whilst others are quite smooth. They are usually white, yellowish, pale green, or pale blue, but always change much in colour as the contained embryo develops. In most eggs there is a depression, often in the form of a rosette, from which the sculptured ribs, or rows of hexagonal depressions radiate. This depression is called the micropyle, and it is through an opening here situated that the spermatozoa gain access to the germ during the process of fertilization. Some eggs are laid with the axis terminated by the micropyle in a vertical position, and these are described as upright; others with the micropylar axis horizontal, and to these the term flat is applied.

The larvæ of butterflies and moths are popularly known as caterpillars. They usually consist of thirteen clearly-defined segments, segment number one being the head. The head is furnished with several simple eyes (Plate B., fig. 2, AA), a pair of very short antennæ (BB), and a very powerful masticatory mouth. The mouth consists of the following organs: The labrum, or upper lip (1); a pair of mandibles, or upper jaws, working like scissor-blades (2, 2); two maxillæ, or lower jaws (3, 3), each carrying a jointed organ termed the maxillary palpus; and the labium, or lower lip (4); which bears another pair of minute jointed appendages—the labial palpi.

Segments 2, 3, and 4, which answer to the thorax of the perfect insect, are each furnished with a pair of legs. They consist of the six following joints (fig. 2): (a) coxa, (b) trochanter, (c) femur, (d) tibia, (e) tarsus, and (f)

claw. These legs correspond to those of the perfect insect. The remaining nine segments of the body constitute the abdomen. Usually segments 7 to 10 and 13, each have a pair of fleshy pads, which are termed prolegs and are furnished on their edges with a row of minute hooklets (see Plate B., fig. 14, proleg highly magnified). It is these hooklets which enable caterpillars to hold on by means of their prolegs with such great tenacity. The number of the prolegs varies considerably in different families. The spiracles, or orifices of the air-tubes, are situated on each side of the larvæ just above the legs. With the exception of the head and segments 3, 4, and 13 there is a pair of spiracles on each segment. The larva is provided with a very complete digestive system, which consists of the following organs (see Plate B., fig. 9): A, the œsophagus; D, the ventriculus; F, the clavate intestine; E, the ilium; H, the colon; K, the malpighian tubes; and O, the spinning vessels. These last open at a small orifice in the labium termed the spinneret (fig. 2, 5). They supply the silken threads which are employed by most larvæ in constructing their cocoons, and which also serve in cases of danger as a rapid means of retreat. In describing the markings on a larva, we distinguish the line down the mid-back as the *dorsal* line, and those on each side of it as *sub-dorsal* lines; the line near the spiracles is termed the *lateral* or *spiracular* line, and any other markings present are referred to in connection with their proximity to these lines.

The entire growth of the insect is accomplished during the larval condition, the increase in size being frequently very rapid. Owing to this circumstance larvæ are often compelled to shed their skin, and in many species a very considerable alteration both in the shape and colour takes place at each moult, or ecdysis as it is sometimes termed. The period between each successive moult is termed an instar; the first instar being the stage immediately following the egg, the second instar that following the first moult, and so on.

The pupa of a Lepidopterous insect is completely encased in a chitinous envelope. With the exception of a slight twirling of the abdominal segments it is incapable of any motion. In the pupa of *Micropteryx* and its allies the mandibles and labial palpi are functionally active, but this is a very exceptional though extremely interesting case. The number of free or movable segments of pupæ varies considerably in different families and genera, and by some authors it is regarded as a character of much importance in

*In this chapter only the briefest possible summary is given of the general characters and structure of the Lepidoptera. Those who desire more detailed information will, of course, consult some of the numerous text books, now available, on the morphology of the Lepidoptera and other insects.

the framing of their classifications. The various organs of the perfect insect are distinctly marked out on the otherwise uniform integument of the pupa. In some families, notably in the *Hepialidae* and *Micropterygidae*, these organs are much more distinctly indicated than in others. Formerly the term *chrysalis* was applied to the pupæ of the Lepidoptera, owing to the fact that many butterfly pupæ are extensively ornamented with golden-metallic markings. (See Plates I, II, and III).

In common with all other members of the class *Insecta*, the body of a fully developed Lepidopterous insect consists of three main divisions: the head, the thorax, and the abdomen.

The front of the head is termed the *face*, the top the *crown*, the sides are nearly entirely occupied by the compound eyes (Plate B., fig. 11, AA), and the lower surface by the organs of the mouth.

The *Eyes* consist of a very large number of simple lenses arranged in the form of two hemispheres, one on each side of the head. The *ocelli*, or simple eyes, are situated on the crown, and are usually almost entirely covered by scales.

The *Antennæ* are two jointed appendages attached to the top of the head above the eyes. They vary very much in structure. The following are the terms used in describing the different forms of antennæ in the *Lepidoptera*:—

1. *Pectinated*, when the joints have long processes like the teeth of a comb. If these are on one side only, the antennæ are *unipectinated*; if on both sides, *bipectinated*. (Plate B., fig. 20, bipectinated antenna of *Nyctemera annulata*.)

2. *Dentate*, when the joints are armed with slight pointed spines.

3. *Serrate*, when the joints have sharp projections like the teeth of a saw. (Fig. 18, antenna of *Persectania composita*.)

4. *Filiform*, or setaceous, when the whole antenna is simple or thread-like. (Fig. 19, antenna of *Epirrhanthis alectoraria*.)

The clothing of the antennæ also varies, and is distinguished as under:—

1. *Ciliated*, when clothed with one or two series of short, fine hairs.

2. *Fasciculate-ciliated*, when the hairs are collected into tufts. (Fig. 17, antenna of *Chlorochystis sandycias*.)

3. *Pubescent*, when the antennæ are clothed with uniform short hairs. (Fig. 19.)

The functions of the antennæ are still a matter of some dispute amongst entomologists. The majority of the older naturalists regarded them as organs of hearing, but it is now considered that an extremely acute sense of smell resides in the antennæ. These organs are almost always more fully developed in the male than in the female, and from this circumstance it seems that one of their functions is to enable the former to find the latter.*

The organs of the mouth are thus distinguished:—

1. The *Labrum*, or upper lip (Plate B, fig. 11, l), a minute rudimentary plate situated in front immediately above the proboscis.

2. The *Mandibles*, or upper jaws (m.m.), two minute sickle-shaped organs situated just below the labrum, also rudimentary.†

3. The *Proboscis*, or *Haustellum*‡ (c), a tubular extensible organ formed of the two maxillæ, or lower jaws, which have become greatly elongated, semi-tubular, and closely pressed together at the edges, but separable at the will of the insect—a structure which enables the organ to be easily cleansed when necessary, and is extremely interesting as indicating so clearly the true development of the proboscis from the maxillæ.

The *Maxillary palpi* are two jointed organs attached to the base of the proboscis and very frequently rudimentary.††

The *Labium*, or lower lip, is situated below the proboscis and carries the *Labial palpi* (figs. 5 and 6), two large jointed organs which are very conspicuous in nearly all the species and often quite conceal the maxillary palpi. They are usually regarded as organs of touch, but their true function does not seem to be properly understood. In the *Lepidoptera* they appear to protect the proboscis, which, when out of use, is always coiled up in a spiral between them. The labrum and mandibles can only be seen by removing the large labial palpi.

The *Thorax* carries the organs of locomotion, which consist of two pairs of wings attached to its sides, and three pairs of legs attached beneath, a pair belonging to each of the three segments of which the thorax is composed. On the front of the thorax there are two flap-like organs covered with scales, termed the *patagia*.

The *Wings* vary greatly in shape, but usually they are triangular. The portion of the wing which joins on to the thorax is termed the *base*. The front margin is called the *costa*, the outer margin the *termen*, and the lower margin the *dorsum*, these being described as situated when the wing is extended in flight. The angle between the costa and termen is called the *apex*, and the angle between the termen and the dorsum the *torvus* (see Plate B., fig. 1). The termen and dorsum are edged with a fringe of hair-like scales, termed the *cilia*. At the base of the hind-wings is generally situated a stiff bristle, or several stiff hairs, called the *frenulum*, the ends of which pass through a chitinous process on the under side of the fore-wing near the dorsum. This process is termed the *retinaculum*, and

†By many modern anatomists these organs are not regarded as vestigial mandibles, but rather as lateral lobes of the labrum. On this account they are often termed *pilifers*.

‡This organ is often termed the tongue. As many mandibulate insects possess a true tongue, and the proboscis of the *Lepidoptera* is not homologous with the tongue, but with the maxillæ, I think the term is misleading.

††A very interesting article on the Maxillæ and Maxillary Palpi of the *Lepidoptera*, by Mr. Philpott, appears in the Transactions of the New Zealand Institute, Vol. LVii, pp. 721-746.

* See "Butterfly Lore" by Dr. Eltringham, p.p. 112-117.

serves, in conjunction with the frenulum, to lock the wings together during flight. In the female both these organs are often very imperfectly developed, the frenulum consisting of several bristly hairs, and the retinaculum of a group of stiff scales. In many of the *Lepidoptera* both frenulum and retinaculum are entirely wanting; in the *Hepialidae* and *Micropterygidae* a membranous or spine-like process called the *jugum* rises from the the dorsum of the fore-wing near the base (see Plate B., figs. 22 and 28, and Plate A., figs. 10, 14).

"The wings are traversed by a system of *Veins*—tubular structures which serve at once as extensions of the tracheal system, and to form a stiff framework for the support of the wing. In the normal type of *Lepidoptera* the fore-wings possess three free veins towards the dorsum, termed 1a, 1b, and 1c; a central cell, out of which rise ten veins, numbered 2 to 11, the sides of the cell being known as the upper median, lower median, and transverse veins respectively; and a free subcostal vein, numbered 12; whilst the hind-wings differ from the fore-wings in having only six veins rising from the central cell, numbered 2 to 7, so that the free subcostal vein is numbered 8 (see Plate B., figs. 3 and 4, assumed type of neurulation of a Lepidopterous insect). In some forms a forked parting-vein traverses the middle of the cell longitudinally, and a second parting-vein traverses the upper portion, so as to form a secondary cell; but these are more frequently absent or represented only by folds in the membrane. In a few forms there is a tendency to the production of several false veins, termed *pseudoneuria*, appearing as short branches from the subcostal vein of the hind-wings to the costa; these are thickenings of the membrane, and are commonly very irregular and variable, often uneven in thickness or incomplete. Sometimes one of these near the base is better developed and more permanent in character; it is then termed the *præcostal spur* (see Plate B., figs. 8^o and 27^o). Modifications in the general arrangement of the veins may arise through any of the following processes, viz.: (1) *obsolescence*, when a vein loses its normal tubular structure, becoming attenuated and reduced in substance, until it appears a mere fold of the membrane (Plate C., fig. 57, vein 5 in hind-wings of *Declana*); (2) *stalking*, when the two veins are fused together for a portion of their length from their base, so as to appear to rise on a common stalk (Plate C., fig. 34, veins 6 and 7 in hind-wing of *Hydriomena*); (3) *coincidence*, when two veins are fused together for the whole of their length, so that one appears entirely absent, an extreme form of stalking; (4) *anastomosis*, when two veins rise separate, meet, and are fused together for a certain distance, and then separate again (Plate C., fig. 23, veins 7 and 8 in the hind-wings of the ♀ of *Tatosoma*); (5) *concurrence*, when a vein rises separate, runs into another, and does not separate again, an extreme form of anastomosis; (6) *connection*, when two veins are connected by a short transverse bar passing from one to the other, a special form of anastomosis, evolved from the ordinary

form under the influence of a tendency to lateral extension (Plate C., fig. 28, veins 7 and 8 in hind-wing of *Paradetus*). Vein 1b in both wings is often furcate at the base.

"The type of veins in the *Hepialidae* and *Micropterygidae* differs from that described above in two essential particulars, viz.: (1) there may be three additional veins in the fore-wings, rising out of vein 11 or 12; and (2) the veins of the hind-wings are practically identical in number and structure with those of the fore-wings, being thus much more numerous than in the ordinary type. There is also often a system of cross-bars between the veins near the base of the wing (Plate B., figs. 22 and 23, neurulation of *Hepialus* (Plate A., figs. 14, 15, neurulation of *Sabatinca*).*

"The structure of the veins can be best observed on the under surface of the wing, where they are more prominent. The student should begin by completely denuding of scales a few wings of common species: the wing should be cut off and laid on a moistened piece of glass, to which it will adhere; the scales should then be removed, first from one surface and then from the other, with a fine, moist camel's hair-brush—an operation requiring a little patience and delicacy of touch; the veins will thus be rendered conspicuous.† When, however, the student has familiarised himself with the general subject, it will not be found necessary in practice to resort to this process; most details will be easily observed without denudation‡; where this is not the case (as where the veins are closely

*It should be explained that the above method of describing the wing veins of the *Lepidoptera* is that which has hitherto been in general use by British lepidopterists, and that practically all the genera of New Zealand *Lepidoptera*, so far described, are characterized on this basis. Its retention in the present work is therefore fully justified. A uniform system of notation of the wing-veins supposed to be applicable to all the orders of insects has, however, been formulated by Comstock and Needham and a complete exposition of the subject may be found in a work entitled "The Wings of Insects," published by J. H. Comstock in 1918. This system has been adopted by a considerable number of entomologists, including some lepidopterists, and as time goes on its more general adoption appears possible. Plate B, figs. 7 and 8, show the Comstock-Needham notation as applied to the wing-veins of a lepidopterous insect, and the following table gives a comparison of the two systems:—

British system.	Comstock and Needham.
12	Costa C
11	Subcosta Sc
10	Radius-one R ₁
9	Radius-two R ₂
8	Radius-three R ₃
7	Radius-four R ₄
6	Radius-five R ₅
5	Media-one M ₁
4	Media-two M ₂
3	Media-three M ₃
2	Cubitus-one Cu ₁
1c	Cubitus-two Cu ₂
1b	1st Anal 1st A
1a	2nd Anal 2nd A
	3rd Anal 3rd A

By means of this table, and the figures 7 and 8 on Plate B, the Comstock-Needham notation may, if desired, be applied to any figure of neurulation given in this work.

†For the examination of the wings taken from dried specimens, immersion in methylated spirits renders the veins visible after partial denudation with the camel's-hair brush. With recent specimens, however, the scales can easily be entirely removed.

‡I have found considerable difficulty and uncertainty in examining the neurulation of undenuded specimens.

crowded or otherwise obscured), the scales can be removed with the brush on the under surface in the locality of the difficulty only, without cutting off the wing or otherwise damaging the specimen, which remains in the collection available for all purposes as before; with proper practice, even the smallest species are amenable to this treatment, which does not require more skill than the actual setting of the specimen. Some workers prefer to put a drop of benzine on the spot, which renders it temporarily transparent; the effect is short-lived, as the benzine evaporates rapidly, and the cilia (if long) are liable to be damaged by this method.”*

The following terms are used in describing the markings on the fore-wings:—*Basal streak*, a short longitudinal streak in the middle near the insertion of the wing; *basal line*, a transverse line crossing the wing at about $\frac{1}{3}$ the distance from the base to the termen; the area between the basal line and the insertion of the wing is termed the *basal patch*; *first line*, a transverse line crossing the wing at about $\frac{1}{2}$ the distance from the base to the termen; the space between the basal line and the first line may be referred to as the *sub-basal area*; *second line*, a similar line crossing the wing at about $\frac{2}{3}$; the area between the first and second lines is known as the *median band* and in many families the following spots, termed *stigmata*, are situated thereon; the *claviform*, a conical-shaped spot on the outside of the first line, below the middle of the wing; the *orbicular*, a more or less round spot situated above the claviform, and the *reniform*, a kidney-shaped spot situated above the middle of the wing just inside the second line. In some families, notably

in the *Noctuidae*, an ill-defined shaded line crosses the middle of the fore-wings and is termed the *median shade*. The central portion of the wing is referred to generally as the *disc*; the space immediately outside the second line is called the *subterminal area*, and is often bounded by a line running more or less parallel to the termen called the *subterminal line*; the space beyond the subterminal line is known as the *terminal area*, and any markings situated on the termen itself are referred to as *terminal dots*, or *terminal lines* as the case may be. A pale, somewhat triangular patch, which is very often present at the tip of the fore-wing, is termed the *apical patch* (see Plate A., fig. 22). The hind-wings are often devoid of any distinct markings, but when a definite pattern is present, the terms used in describing the fore-wings may also be applied to a description of the hind-wings.

The *Legs* consist of the following joints (see Plate B., fig. 21): (1) *coxa*, (2) *trochanter*, (3) *femur*, (4) *tibia*, (5) *tarsus*, (6) *claw*. The tarsus normally consists of five joints, but is more or less aborted when the leg is not employed for walking. The spines (SS) on the tibiae of the several legs vary considerably in size and number. They are often useful to the systematist for purposes of classification. The abdomen consists of nine segments, some of which are often fused together. It contains the various internal organs, of which the most important are those of Digestion and Reproduction. The *Digestive System* (Plate B., fig. 10) consists of the following organs: A, the *oesophagus*, or throat; C, the *sucking stomach*; D, the *ventriculus* or stomach; E, the *small intestine*; G, the *cæcum*; H, the *colon*; K, the *malpighian tubes*; N, the *salivary vessels*.

*Meyrick, Hand-book of British Lepidoptera, pp. 4-7.

CHAPTER III.

ON THE HABITS AND GEOGRAPHICAL DISTRIBUTION
OF NEW ZEALAND LEPIDOPTERA.

It is well known to the most casual observer of nature that butterflies only fly in bright sunshine, whilst the majority of moths seldom rouse themselves to full activity until the dusk of evening is well advanced. Speaking generally, glades in forests, river beds, roadsides, and the open tussock lands are the most productive localities for the few butterflies (Plates IV. and V.) indigenous to New Zealand. The large and conspicuous *Danaida plexippus* is probably our most striking butterfly. It is very rare, but when found is generally seen in gardens or fields. It is a very rapid flier, soaring with fully outstretched wings, the vivid colouring of both surfaces being plainly visible and giving the insect a superb appearance. Originally believed to have been confined to the American Continent, it is rapidly extending its range to many of the warmer regions of the world. This wide dispersal has probably been effected by the butterfly's powerful flight, a strong migratory instinct, favoured by the elements, and the spread of its food plants, by artificial means, has enabled the insect to effect a permanent settlement, where formerly the means for its sustenance did not exist.*

Single specimens of a much smaller allied species, *Danaida chrysippus*, have been captured at rare intervals but, as yet, this butterfly cannot be regarded as established in New Zealand. Its range elsewhere is extremely wide, extending throughout Australia, Africa, West Asia, the East Indies, and Greece. It is extremely distasteful to birds, and on this account is closely mimicked by quite a number of tropical butterflies.

Of the *Satyrides*, or Ringlet butterflies, there are four species in New Zealand, quite a remarkable number when the extremely limited butterfly fauna of the country is considered. In fact these endemic Satyrids constitute the most interesting section of the New Zealand Rhopalocera. The commonest species is *Argyrophenga antipodum*, which ranges throughout the whole of the South Island from the high grassy lands near Cook Strait to the tussock plains of Southland. It is essentially the butterfly of the tussocks, delighting to fly amongst them, in a lazy aimless manner, during the hottest summer days from January till March. In such localities it is often very abundant, and is always very easy to catch. Although extensive tussock-covered lands exist in many parts of the North Island (notably the

great plains in the elevated central region*) which appear to be ideal localities for *A. antipodum*, careful investigation has failed to reveal its presence, and the absolute restriction of this insect to the South Island is one of the most remarkable and inexplicable facts in connection with the distribution of our native butterflies.† The nearest allies to *Argyrophenga antipodum* are found in the mountains of Chili.

The coal-black *Erebia pluto* is a common butterfly on all high mountains throughout the South Island. It is very rarely found lower than 4,000 feet above sea level, is most abundant between 5,000 and 6,000 feet, and has been observed as high as 11,000 feet on the summit of Mount Malte Brun, in the New Zealand Alps. It frequents shingle slides, delighting to fly over the heated stones in the hottest sunshine, but disappears immediately a cloud passes over the sun. The would-be captor of this fine insect must always approach the butterfly from behind, and strike rapidly with the net, otherwise he will probably lose his prize.‡ The smaller and browner *Erebia butleri* is much more local. It has occurred at Whitcombe's Pass, Canterbury, the Mount Cook region, and on many of the ranges at the head of Lake Wakatipu, frequenting rough grassy slopes between 3,000 and 4,000 feet above the sea level. Its flight closely resembles that of *Argyrophenga antipodum*, to which insect it is evidently nearly allied. It is not so strong on the wing as *Erebia pluto*, neither has it any liking for hot shingle, but prefers to remain among the shaggy mountain grasses (*Danthonia*). Both these mountain butterflies are closely akin to the *Erebias* found in the Northern Hemisphere, and an allied form occurs in South America. The finest of our Satyrids is *Dodonidia helmsi*, which is found in beech forests in both Islands, sometimes occurring where its food-plant (*Gahnia setifolia*) is abundant. It is a local species, and as it appears on the

* In March, 1887, my brother, Mr. W. B. Hudson, walked from Marton to Taupo, thus traversing the great tussock-covered plateau of the North Island when in its absolutely primitive condition. He was experienced in observing insects and kept a vigilant watch for *Argyrophenga antipodum*. He, however, failed to see a single specimen, although the conditions for its appearance were favourable.

† Some years ago I understand that specimens of *Argyrophenga antipodum* were artificially conveyed from the South Island and liberated on the tussock plains in the centre of the North Island. Mr. H. W. Simmonds was, I believe, responsible for this unfortunate proceeding. There is, however, so far, no evidence that the butterfly has established itself on the tussock plains of the North Island.

* See Entomologists' Monthly Magazine, 1914, p.p. 234-237; on the Geographical Distribution of *Danaida plexippus* by Commander J. J. Walker, M.A., R.N., F.L.S.

wing for a very short period, generally during the first fortnight in February, and has a provoking habit of flying amongst the branches of the beeches just out of reach, it is a very difficult species to obtain. It is a noteworthy fact that this is the only Satyrid found in the North Island. Specimens from the South Island are usually smaller and less robust than those from the North. *D. helmsi* may be allied to the Australian *Oreixenica kershawi*.

The large and brilliant *Diadema bolina* has occurred at quite a number of localities in the North Island and Northern part of the South Island. It is usually found in gardens or fields, and from its gorgeous appearance when on the wing, is readily identified. In this country it must be regarded as a rare and distinguished visitor, but it is common throughout Australia, Java, Sumatra, and many of the Pacific Islands. The three species of the beautiful genus *Vanessa* are also frequently observed in cultivated districts, and like their congeners in other lands have a distinct preference for hill-tops. *V. gonerilla*, which is perhaps the most brilliantly coloured butterfly endemic to New Zealand, is a most familiar garden insect, and is found in more or less abundance in warm sunny spots throughout the entire country. *V. cardui* frequents dry roads, or river beds, delighting to rest on stones, and flying away with great rapidity on the approach of an intruder. It is probably the most difficult of our butterflies to capture. *V. itea* seems to be confined to the North Island and northern portions of the South Island, but this species and *V. cardui* are most uncertain in their appearance. Both are found in Australia, and *V. cardui* is practically cosmopolitan. In some years these two butterflies are tolerably common, whilst at other times several seasons may pass without our meeting with a single specimen. All three species of *Vanessa* appear to hibernate as perfect insects, as worn specimens of each have been taken in early spring. Another butterfly of very irregular appearance is *Precis velleda*. During one or two seasons large numbers of this common Australian insect were observed on the shores of Cook Strait, but generally speaking it is not seen. Like *V. cardui* it is fond of dry, stony places, and as its flight and general appearance is suggestive of that species, it may be sometimes overlooked.

In the extensive family *Lycaenidae*, which includes the familiar Copper and Blue butterflies, *Chrysophanus salustius* is without doubt the commonest and most generally distributed butterfly in New Zealand, its range extending from the far North of Auckland to Invercargill. It frequents alike glades in forests, sunny scrub and open grassy country, and is often very common in gardens, fields, and along roadsides. It is a merry little insect, and its brilliant colouring, abundance, and great variability combine to render it one of our most interesting species. The much darker and less brilliant *C. enysi* is found principally in the North Island and the extreme North of the South Island. It frequents openings in forests, but it is very much more rarely met with than *C. salustius*. The

brilliant little metallic purple *C. boldenarum*, our smallest butterfly, is frequently very common in dry river beds in both Islands, and is often found on stony roadways and paths near rivers as well as high up on mountains. It needs a very bright light to fully reveal the refulgent colouring of the male. This very interesting insect exhibits much variation in the markings on both the upper and under surfaces of the wings. These three New Zealand species of *Chrysophanus* are endemic, but closely allied to forms found in Chili and in the Northern Hemisphere. Of the "Blue" butterflies the dingy little *Lycaena labradus* is very common in many localities from the Far North of Auckland to Lake Wakatipu, usually frequenting dusty roadsides or dried-up pastures. It is a wide-ranging species, being also found throughout Australia and in many of the South Sea Islands.

Of the very conspicuous and handsome family of Hawk-moths (*Sphingidae*) (Plate VI., figs. 15, 16), we have but two species in New Zealand, both insects of very powerful flight and wide distribution. These are no doubt casual immigrants, quite unconnected with the original fauna of the country. *Deilephila celerio*, known in England as the Silver Striped Hawk-moth, first appeared in New Zealand in the year 1903. It is extremely rare, and so far has only occurred in the Auckland, Cook Strait, and Invercargill districts. Elsewhere its range extends throughout West, Central and Southern Europe, South Asia, Africa, and Australia. *Sphinx convolvuli* has been known in New Zealand from the earliest times, and is common in the Northern portions of the North Island. It is practically cosmopolitan, having been found with slight geographical variations throughout Europe, Asia, Africa, Australia, and America. Both these insects fly with extreme velocity at evening dusk and, with their long proboscises, extract honey from flowers, without settling, whilst poised in the air above them.

The beautiful family *Arctiidae* (Plate VI.), popularly known as "Tiger Moths" and "Footmen," is very sparsely represented in New Zealand. The peculiar genus *Metacrius* is our only exponent of the true Tiger Moths. In this genus the females are wingless, but the very active and gaily coloured males fly with great rapidity in the hottest sunshine. With the exception of *M. strategica*, which is commonest on the tussock plains of Southland, these insects are restricted to mountainous regions usually over 4,000 feet above the sea level. The wide ranging *Utetheisa pulchella*, known in England as the "Crimson Speckled," occurs very rarely in New Zealand and is evidently a casual immigrant, but the allied black white-spotted *Nyctemera annulata* is everywhere extremely abundant, being found throughout both North and South Islands and Stewart Island. It flies most freely in the early morning sunshine, but it is on the wing all day, and is often mistaken for a butterfly by the uninitiated.

Of the great family of night flying moths generally known to entomologists as the *Noctuidae* (Plates VI.—X.), over one hundred species are found in New Zealand but, with the exception of the Melanchrid group, most of these are scattered stragglers, which appear to be the result of accidental wind-borne immigration over a wide expanse of sea. Practically all the New Zealand species are night fliers, although a stray specimen may sometimes be observed flying in hot sunshine, but this is usually the result of some untimely disturbance. Most of the *Noctuidae* are dull coloured, their general wing pattern assimilating with the varied hues of dead leaves, and as they are most abundant during the autumn, the value of this form of protective colouring is obvious.

The family *Geometridae* (Plates XI.—XVIII.) comprises the most beautiful, varied, and extensive assemblage of the larger moths in New Zealand. These insects are more in evidence than the sombre *Noctuidae*, and many species fly very readily in the day time, whilst some only do so when disturbed. The remarkable long-bodied moths belonging to the genus *Tatosoma* frequent forests, and are usually found resting on tree trunks by day or flying over blossoms in the evening. The charming little *Elvia glauca* when resting folds its wings so as to resemble the uneven surface of a lichen. The very beautiful and extensive genus *Chloroclystis* contains species which frequent both forests and open country, and from their extreme variability, both in the larva and final conditions, present unusual difficulties to the student. Most of the species rest by day, with outspread wings, on tree trunks or rock surfaces, their protective pattern being often extremely complex. All the species are very much on the alert, and fly with considerable rapidity when in any way disturbed. In *Eucymatoge* both pairs of wings are very delicately striped so as to resemble bark, the insects always resting with them outspread. *Hydriomena* has the hind-wings without definite markings. The species fly freely in the day-time when disturbed, but not otherwise. They rest with the hind-wings almost entirely covered with the fore-wings, the whole insect then approximating to the shape of a triangle. Their larvæ feed amongst dead leaves and low plants, during the winter, and hence are very seldom observed. The larvæ of the allied genus *Asaphodes* have similar habits. The odd little *Paradetis porphyrias* inhabits ferny glens in beech forests and flies by day with a mazy flight close to the ground. The large genus *Xanthorhoe*, more extensively represented in New Zealand than elsewhere, comprises a number of highly ornamental insects, many of which are widely distributed throughout the country. None are regular day-fliers, but all immediately take wing on the slightest disturbance. The genus *Notorens* and its allies *Lythria* and *Dasyuris* are nearly all gaily coloured insects, and fly very rapidly in the hot sunshine. Most of the species frequent high mountainous regions, many are very local, and from their striking appearance are much prized by collectors. The pretty little

Leptomeris rubraria swarms over dried-up pastures, in February and March, and is also an abundant species in Australia. The dark-coloured little species belonging to the genus *Dichromodes* frequent rock surfaces, exposed to hot sunshine, and fly immediately on the approach of an intruder. The genus *Selidosema* comprises a large number of interesting species, chiefly frequenting forest districts. They rest quietly on tree-trunks or palings during the day-time and, unless disturbed, seldom take wing until the dusk of evening. The genus *Azelina* and its allies *Gargaphia* and *Sestra* include another assemblage of forest-dwelling insects. Their larvæ feed on ferns, and the perfect insects are extremely variable. The closest allies to these genera are found in South America. The species included in the genus *Declana* have very stout bodies and, in superficial appearance, somewhat suggest some of the European species of *Notodontidae*. Their flight is strictly nocturnal, but they may be found resting on tree-trunks or palings during the day-time. *Declana glacialis* differs however very strikingly from its congeners. It frequents mountains in the South Island at elevations of from 3,000 to 4,000 feet and flies with a rushing headlong flight, in sunshine, especially towards sunset.

In the great family *Pyrallidae* (Plates XIX.—XXII. and XXIV.), most of the species readily take wing by day. The genus *Crambus*, which includes the well-known grass moths, comprises no less than forty-five endemic New Zealand species, whilst there are no indigenous species in Australia, and the remarkable significance of this fact will be referred to later on. Many of the *Crambi* may be ranked amongst the most abundant of our insects. They often rise in swarms as we walk amongst the tussocks, where the greater number of the species are found. *C. flexuosellus* and *C. ramosellus* abound on the edges of forests, whilst the very large and handsome *C. crenaeus*, *C. diptorrhous*, *C. isochytus* and allied forms are rarely found, except on high grass-covered mountains about 4,000 feet above sea level. These large *Crambi* are, however, very uncertain in their appearance. They will, at times, be extremely abundant, whilst on another visit to the same mountain, at the same season, not one will be found. The brilliant little *C. heliotes* flies rapidly over damp mossy places, in hot sunshine, but is very local. Most of the other species do not usually fly freely unless disturbed. On the tops of high mountains, and in certain other special localities, *Crambus* is replaced by the interesting and closely allied genus *Orocrambus*. The species included in *Orocrambus* are all day fliers, and very darkly coloured, enabling them to absorb heat rapidly, and thus take advantage of the fitful periods of hot sunshine characteristic of alpine climates. The genus *Scoparia* (of which there are one hundred and four known species in New Zealand, against a total of only twelve species in Britain) is found in every part of the country but, as with most genera, is most extensively represented in the South Island. A few of the dark-coloured mountain species fly by day, but the majority

rest with closed wings on rocks or tree-trunks, immediately taking wing when approached and flying with considerable rapidity. The gem-like insects included in the genus *Diptychophora* frequent forests. The larvæ of *Diptychophora* and *Scoparia* feed on mosses; of *Crambus* on grasses. These three genera must be regarded as highly characteristic of the New Zealand fauna, and will be specially referred to later on. Setting aside *Crambus*, *Scoparia*, *Diptychophora*, and their allies, it may be safely said that the remainder of the *Pyrallidae* represent the results of accidental wind-borne immigration, over a wide sea, and as many of the *Pyrallae* are known to be great travellers, these stragglers might reasonably have been more numerous than we now find them.

The lovely Plume moths included in the family *Pterophoridae* (Plate XXIII) fly freely at evening dusk, the white species being very conspicuous at that time. They also take wing very readily by day, if the plants amongst which they are resting are in any way disturbed. The common White Plume (*Atucita monospilalis*) is very conspicuous when at rest, bearing a close resemblance to the letter T; the anterior wings are stretched out at right angles and conceal the hind wings, which appear narrower than they really are from being partially folded, and the legs being brought down close to the body, escape observation at a first glance. Although these exquisite insects are found in nearly every part of the world they are nowhere very numerous.

Morova subfasciata (Plate XXIV., figs. 25, 26), the single representative of the interesting family *Thyrididae*, flies in hot sunshine with great activity. This family is generally supposed to represent the ancestors of the butterflies, and is much more numerous in tropical countries.

The larvæ of the remarkable insects comprised in the family *Psychidae* (Plate XLIV., figs. 9 and 14), of which there are two species in New Zealand, construct portable cases, which they carry about with them all their lives, and in which they change into the pupa state. The males are extremely active, and when reared in captivity will speedily knock themselves to pieces, unless promptly killed after emergence. The females are, however, completely helpless, and never leave the case they inhabited whilst a larva.

Most of the *Tortrices* (Plates XXII., XXIV.—XXVII.) take wing in the late afternoon or evening, a few only, principally the mountain species of *Eurythecta*, *Epichorista*, *Gelophaula*, and *Cnephasia*, flying rapidly in hot sunshine. Many are sluggish in habit, and are found resting on the leaves or stems of plants. When disturbed most of the *Tortrices* drop to the ground, and conceal themselves amongst dead leaves and other refuse, their general brown colouring greatly assisting them in obtaining the desired concealment. The New Zealand species of this extensive family are not numerous, but are extremely variable. The larvæ are polyphagous, and from the change of environment which is constantly taking place owing to the extension of settlement, it has been suggested that careful

observation may detect the evolution of new species. The *Tortrices* show a more marked affinity with Australian forms than most of the other tribes of New Zealand Lepidoptera.

In the extensive family of *Tineidae* (Plates XXV., XXVII.—XL. and XLVI.) we have a very numerous assemblage of species, usually small in size, but most diverse in habits, and frequently of gorgeous appearance. The members of the genus *Gelechia* and its allies sometimes fly in warm sunny glades, during the late afternoon, but are not freely on the wing until after dark. The species of *Elachista* take short rapid flights amongst grass, in the late afternoon sunshine, when the pairing of the sexes occurs. The numerous obscurely-coloured species comprised in the genus *Borkhausenia* are nearly all very sluggish insects and fly by day only when disturbed, but a few such as *B. siderodeta* and *B. chrysogramma* are active sun-loving insects. The glorious little *Compsothis bifaciella* swarms amongst Rangiora (*Brachyglottis repanda*) during November and December, delighting to bask on leaves in the hottest sunshine, when its gem-like colouring is seen to full advantage. *Gymnobathra* appears in late summer and autumn, and the species approximate in colouring to dead leaves, but an interesting exception occurs in the case of *G. omphalota* which is black with whitish markings and flies in hot sunshine. The species comprised in the genera *Trachypepla*, *Izatha*, and their allies are protectively coloured, most of the patterns resembling lichens or mosses, the insects resting quietly on tree-trunks during the day-time, where they are very difficult to discover. Most of the females of the genus *Atomotricha* have rudimentary wings, and must be looked for on paling fences after dark. They appear during the most inclement time of the year, i.e., in July, August, and September, and, when seen in lamp-light, they have a strong superficial resemblance to spiders. The males are found at the same time, but owing to the low temperatures then prevailing do not readily fly. *Cryptolechia* and *Proteodes* include sluggish insects, which only take wing when disturbed, and even then drop to the ground almost immediately, and hide amongst dead leaves, where their protective colouring enables them to successfully escape detection. The beautiful greenish-white *Nymphostola galactina* has similar habits, except that its white wings clearly imitate the fallen petals of the flowers of its food-plant (*Myrtus bullata*). All these genera and their allies, constituting the sub-family *Oecophorides*, embrace that portion of the *Tineidae* most characteristic of the New Zealand fauna. The beautiful little moths comprised in the genus *Stathmopoda* have a peculiar habit of resting with either one or both of their hind-legs elevated in the air. Although not day-fliers they take wing on the slightest disturbance. *Heliothis*, as the name implies, includes sun-loving species which fly with great rapidity over the tops of brushwood in the hottest sunshine and are most active near the middle of the day. The single other species of this essentially New Zealand genus hails from South America.

The little insects belonging to the genus *Simaethis* fly with a peculiar mazy flight, and rest on flowers in brilliant sunshine. The cosmopolitan *Choreutis bjerckandrella* flies in bright sunshine, and loves to bask in the sun on leaves or stones. The species of the extensive genus *Glyphipteryx* are all freely on the wing in bright sunshine, the lustrous metallic markings of many of them requiring the most vivid illumination to fully reveal their glories. In November and December the rather dull-coloured *G. iocheaera* may be seen swarming amongst rushes "flying from tuft to tuft and then pausing awhile to fan itself as though the heat of the summer's day were almost insupportable."* This habit seems common to the members of the genus all the world over. The species of *Batrachedra* fly freely about sunset, and at this time the pure white *B. psathyra* may often be seen in swarms winging its way through the long grass, and resting from time to time on a grass blade, waving first one and then the other of its graceful antennae. The lovely insects comprised in *Gracilaria* have somewhat similar habits, except that many of these fly in hot sunshine earlier in the day. Both *Batrachedra* and *Gracilaria* rest standing on tiptoe, with the fore and intermediate legs outstretched, the head being much elevated and the apex of the wings resting on the ground. The object of this remarkable and characteristic attitude is not fully understood, but it certainly gives the little moth a most unreal appearance. The species belonging to the beautiful and most interesting genus *Erechthias* and its allies rest on palings or tree trunks during the daytime. The probable object of the curious curled wing-tip, with its eye-like marking, is referred to elsewhere. A black species, *Erechthias externella* is a sun-lover, and appears in early spring, flying actively between 4 and 5 o'clock in the afternoon. The large and conspicuous *Archyala terranea* flies with a mazy flight, during the late afternoon, in October and November, when it is very conspicuous. On first alighting its antennae are kept in extremely rapid motion. The species belonging to the curious genus *Lysiphragma* rest on tree-trunks in dark forests, the raised tufts of scales on their wings causing them to resemble moss or irregularities on the bark. Most of the members of the genus *Mallobathra* are active sun-loving insects; their larvae construct most interesting portable cases. In the closely allied genera *Scoriodyta* and *Taleporia* the females are completely wingless, and sit on the outside of the case, awaiting the arrival of the males. The males of *Mallobathra crataea* fly wildly over bushes, in the sunshine, early in September and rejoice the heart of the collector after the long inaction of winter.

The very large and conspicuous insects comprised in the family *Heptaliidae* (Plates XLI.—XLIII.) are all night-flying species, and may be seen travelling with amazing velocity just about dusk. When quite dark they are attracted by light, and often dash against the window panes of houses with such force as to somewhat startle the in-

mates. From their extreme activity they are often called swifts, but it has been well said that, when seen at rest in the daytime, one of these insects appears a most sluggish creature and when touched will probably fall down as though dead, and no one would then conceive it was the swift of the previous evening. *Heptalis virescens* is closely related to several Australian forms, but the genus *Porina* occurs in Patagonia as well as in Australia.

The brilliantly coloured little insects included in the family *Micropterygidae* (Plates XXXIX., and XLVI.) are all day-fliers, mostly inhabiting damp sunny glades in forests. They fly with considerable rapidity in the sunshine, usually in partially shaded places, and in such varied lights are often extremely difficult to see. The insects comprised in the remarkable genus *Sabatinca* are probably the most primitive forms of Lepidoptera now existing, and on this account are of extreme interest.

From the foregoing general remarks on the geographical distribution of the New Zealand Lepidoptera, the reader will have gathered that the largest and most characteristic genera of our native moths are, *Melanchra* and its allies among the *Noctuidae*; *Xanthorhoe*, *Notoreas*, *Dasyuris* and *Selidosema* amongst the *Geometridae*; *Crambus*, *Diptychophora* and *Scoparia* amongst the *Pyrallidae*, and *Borkhausenia*, *Gymnobathra*, *Izatha* and their allies amongst the *Tineidae*. It is a very remarkable fact that almost all these genera, which form such an important element in the New Zealand fauna, are not characteristic of Australia, but are traceable to South America, and the same applies to three of the Satyrids and the three *Chrysophani* amongst the Butterflies. We are therefore forced to assume that these highly characteristic forms reached New Zealand by way of the Antarctic at a time when its climate was much less rigorous than at present, as all the known facts in connection with their present geographical distribution, show that they did not come either by way of the Pacific Islands, or Australia. Furthermore, it appears most probable that *Scoparia* originated in the Antarctic itself, and its larval habits and requirements fit it for such a locality. This assumption is rendered likely, not on account of the very large number of species known in New Zealand, which now amount to one hundred and four, and additions are yearly being made by collectors, but rather on the extremely diverse nature of the species themselves, such diversity being much greater amongst the New Zealand forms, than amongst those found in Europe. The allied genus *Diptychophora* appears to have had an Indo-Malayan origin, whilst the remainder of the genera specially mentioned, seem to have originated in the Northern Hemisphere. The whole of the New Zealand species of *Crambus* (including *Orocrambus*) are probably the descendants of one immigrant species only, and the same holds good in respect of all the New Zealand species of *Borkhausenia*. With regard to the genera, which are assumed to have originated in the temperate regions of the Northern

*Stainton.

Hemisphere, it must be conjectured that their ancient representatives travelled to South America by way of the great mountain chain of the Rocky Mountains and the Andes. In this way alone could they have escaped competition with the innumerable denizens of the tropics, and their tolerance of low temperatures would have enabled them to survive the vicissitudes of a mountain climate, during the prolonged period which would have been required for their dispersal. An examination of a circumpolar map of the Southern Hemisphere shows that the main mountain chains of South America, the Antarctic and New Zealand, to some extent, traverse the globe in a common direction and that these three mountain systems are not so remote from each other, as the maps of the world in ordinary use, would lead one to suppose. It is therefore quite a reasonable theory, that the dispersal of these northern forms of life, took place through the intermediary of the Antarctic, at a time when its climatic conditions were much milder than now.

Again from the life-histories that follow it will be seen that quite an unusual number of the larvae of the New Zealand Lepidoptera (especially amongst the Pyralidae and Tineidae), are internal feeders; either living within the

branches of trees, or under bark, and subsisting on wood, or subterranean feeding on the roots of grasses, or on moss. These habits would enable the larvae to thrive in a cold, wet, tempestuous climate, such as no doubt existed in the Antarctic lands, when the climatic conditions there were much less severe than at the present time.

Finally, corroborative evidence of this view is afforded by the distribution of the species of Lepidoptera within New Zealand itself, and in this connection the reader is invited to consult the detailed census of species at the end of this book. The great preponderance of species in the South Island, especially amongst the larger genera, is only intelligible on the assumption that they entered New Zealand *from the South*, and is absolutely inconsistent with the view that the bulk of the Lepidopterous fauna was derived from Australia and the Pacific Islands by way of the North Island.*

* The general conclusions set out in this Chapter, regarding the Geographical Distribution and Affinities of the New Zealand Lepidoptera, have been taken from Mr. Meyrick's published works, supplemented by the private correspondence I have been privileged to have with him. Whilst thus acknowledging my indebtedness, I have no desire to commit Mr. Meyrick to any responsibility, in connection with the manner in which I have expressed his views.

CHAPTER IV.

ON CERTAIN PHENOMENA EXHIBITED BY
THE LEPIDOPTERA.

In the present chapter it is proposed to give a brief account of some of the more interesting phenomena exhibited by butterflies and moths during their lives, but before doing so it will be desirable to present, in the most elementary possible form, a general view of the leading principles of organic evolution, as set out by Darwin and his numerous followers. Prior to the time of Darwin, most naturalists were quite satisfied to collect facts, but they seldom attempted to interpret the facts, or to draw any general conclusions, or deductions, from the masses of information they had so laboriously accumulated. The birth of philosophic natural history practically dates from the publication of Darwin's "*Origin of Species*," and since the appearance of that epoch-making work, new methods have been adopted, and the entire study of natural history revolutionised.

The theory of the origin of species, first propounded by Darwin, is dependent upon the following indisputable factors:—

1. *Variation.* No two individuals are exactly alike. There are always some variations from the parent form, sometimes slight, sometimes considerable. This is abundantly shown amongst the New Zealand Lepidoptera, many of the species of which are highly variable.

2. *Inheritance.* Many of these variations are inherited—a fact demonstrated by our domestic plants and animals, where man has selected and bred from varieties suitable for his purposes, and has thus produced races in which the variation is permanent. Many of the races of domestic animals differ as much from one another as do some distinct species of wild animals.

3. *Struggle for Existence.* All animals and plants produce far more offspring than can possibly survive, thus giving rise to the struggle for existence. For example: The average number of eggs laid by a Lepidopterous insect is certainly over 100, and in many species this number is greatly exceeded. Assuming each female to lay 100 eggs, the progeny from a single pair would amount, after six generations, to over six million individuals.

4. *Natural Selection, or the Survival of the Fittest.* In the struggle for existence which necessarily results from such a great increase of individuals, those variations which favoured the possessors would be preserved, whilst those which did not, would be gradually exterminated. This principle of the preservation of the favourable varieties in

the struggle for life is called Natural Selection, or the Survival of the Fittest.

5. *Divergence of Character.* As there are so many different places and conditions in the economy of nature which can be occupied by organic beings differently constituted, individuals which diverged most from the original type would be brought into less severe competition, than those which diverged only in a slight degree. For instance, if we represent the original form as A, occupying one place in the economy of nature; a second form as B, occupying a somewhat similar place; a third form as C, occupying a very different place to A although somewhat similar place to B, it is obvious that B would enter into severe competition with both A and C, whilst A and C might not tend to any great extent on one another's place in the natural economy; hence B would be exterminated before either A or C. In other words, natural selection continually tends to increase the slight differences, which we call varieties, into the greater differences, which we call species.

In addition to the operation of natural selection, it was formerly considered that the inherited effects of use and disuse had played an important part in organic evolution, but later investigations have shown that attributes acquired by the individual during its own life-time are very seldom transmitted to the offspring, and the inheritance of acquired characters is not therefore now generally regarded as an active principle in organic evolution.

It has been contended that species have arisen through sudden and great variations from the parent stock, which have been termed mutations. It is possible, that in isolated cases, species may have sprung into existence through sudden favourable variations, but the balance of evidence in this, as in most other cases of natural change, is in favour of a series of gradual adaptive transformations, by means of minute variations, probably extending over a very prolonged period. In connection with the mutation theory, mention should be made of Mendel's Law of Heredity, which shows that certain characters are inherited by a definite proportion of the offspring. For instance, in the historic example of peas, experimented on by Mendel, it was found that by crossing tall and short peas, there resulted in the second generation 25 per cent. of pure tall peas, 25 per cent. of pure short peas and 50 per cent. of apparent tall peas, and the last named, when subsequently seeded, resulted in tall and short peas in similar definite

proportions. Experiments on some well-known varieties of European Moths have given like results, but in other cases no definite proportions have been obtained. From an evolutionary standpoint, Mendel's Law is important, as it necessarily, to a great extent, prevents the swamping effects of interbreeding. In other words, if a useful variety arises, and is subject to Mendel's Law, it will ultimately be fully reproduced in at least 25 per cent. of the offspring.

We will now pass to the primary subject of this chapter and consider a few of the more interesting and important phenomena, exhibited by Lepidoptera, and their interpretation by means of Natural Selection.*

The close likenesses which the majority of Lepidopterous insects bear to inanimate objects is termed protective resemblance, and is, in fact, by far the most general method by which such small and defenceless creatures have contrived to escape their numerous enemies. This class of protection is very prevalent in New Zealand, as elsewhere, and has practically dominated the evolution of wing patterns and general coloration, in most of our native butterflies and moths. In the butterflies protective tints and patterns are chiefly confined to the under-surfaces of the wings, which alone are visible when the insect is resting. Examples of this class of protection are well shown in *Vanessa gonerilla* and *V. itea*, where the elaborate tracery of browns on the underside of the hind wings, gives the insect a deceptive resemblance to a dead leaf. The vivid yellow colouring of the underside of *Chrysophanus salustius* exactly imitates the colour of the dead or dying leaves of many of our native shrubs, and affords the butterfly most efficient protection, when resting amongst foliage during wet or cloudy weather. In the moths protective patterns are chiefly confined to the upper surface of the forewings, but when both pairs of wings are exposed to view in repose, these patterns are present on the hind wings in addition.

An attempt has been made, when dealing with each species, to explain, as far as possible, the protective value of both the wing patterns and the position assumed by the insect when at rest. The reader is therefore referred to subsequent chapters for further examples of protective resemblances, and it must here suffice to state that the wing patterns of Lepidoptera are varied to assimilate with almost every conceivable environment, including such natural objects as bark, moss, dead leaves, lichens, bird-droppings, twigs, seeds, flower petals, etc., etc.

*It is perhaps proper to mention here that attempts have been made, by some modern scientists, to discredit the explanation, by means of Natural Selection, of the phenomena briefly described in this chapter. In reply to such objectors, I would quote the following paragraph from Professor Poulton's address, delivered to the Entomological Society of London, on 20th January, 1926: "No reasonable hypothesis has ever been advanced on this subject except the one which assumes that the adaptive appearances of insects—protective resemblances, warning colours, mimicry (Batesian and Müllerian)—have been gradually brought to a high pitch of perfection by selective destruction wrought by vertebrate enemies, above all by selection guided by the keen sight of birds."

It has been pointed out by Mr. A. H. Thayer that the protective resemblances we observe in animals (including, of course, insects), are not produced by a mere approximation in colour to surroundings, but that the general scheme of coloration is so arranged, that it has the effect of actually effacing the animal, as a distinct object in the landscape. For instance, the silver stripes on the underside of the hind-wings of *Argyrophenga antipodum* do not actually resemble blades of grass, but they exactly reproduce the light and shade effects present in a clump of grass, and thus efface the insect from view. The same effect is produced by the white streaks on the forewings of so many species of *Crambus*. Again, such vivid contrasts of colour, as those existing in *Declana atronivea* and *D. egregia*, as well as the vivid median bands, on the forewings of so many Geometers, break up, so to speak, the real outline of the insect, so that it no longer arrests the eye, as a distinct object apart from the general landscape. Mr. Thayer's illuminating remarks, on the general question of protective resemblance, are due, no doubt, to his extensive artistic experience, and must, I think, be regarded as one of the most important contributions to this branch of Natural History since the time of Darwin. Possibly the strongly contrasted light and dark bars on the legs of many species of Lepidoptera prevent enemies from recognising their true nature and seizing hold of them.

In rare instances we find species conspicuously or gaudily coloured, and these almost invariably have a nauseous taste and are avoided by birds as unfit for food. Such species are said to be protected by warning colours, and it is obvious that unless a nauseous insect can be recognised before it is tasted, the possession of objectionable attributes would be of no benefit to it in the struggle for existence. Warning colours are, in fact, a protection against experimental tasting, as birds and other enemies soon learn to avoid any nauseous species which can be easily recognised. Warning colours are very common in the tropics but rarer in temperate regions. *Danaiida plexippus* and *Nyctemera annulata* may be instanced as good examples of warning colours amongst the New Zealand Lepidoptera.

Conspicuous colours, temporarily displayed, often render the pursuit of an insect much more difficult than if the entire insect were protectively coloured. This is well shown in several species belonging to the genus *Notoreas*, which have the forewings coloured grey and closely resembling rock surfaces, the hind wings being bright red, or orange. The momentary exhibition of the brilliant hind wings, when flying, makes it much more difficult for an enemy to locate the exact position of the insect, when it settles amongst the rocks. The protective tints of the forewings are then alone displayed, and the eye is unable to pick up a dull object, which has suddenly displaced a brilliant one.

The black coloration, characteristic of most Lepidoptera inhabiting high alpine regions, has no doubt been acquired for the purpose of absorbing the heat of the sun,

during the transient periods of intensely hot sunshine which occur in such localities. The same class of colouring also prevails amongst species found in high latitudes. Lord Walsingham, who first drew attention to these adaptations, made some very interesting experiments by placing a black and white insect on snow, and observing the relative rate at which each sank when exposed to the sun's rays. It was found in every case that the black insect made a much more rapid impression on the snow than the white one, owing to its superior absorptive powers. It is clear that in a cold and stormy climate, like that existing in alpine or sub-arctic regions, the black insect, which matured rapidly, and was able to pair and deposit its eggs in the shortest possible time, would have a distinct advantage in the struggle for existence over the more slowly developing white insect, which, owing to its inability to rapidly absorb heat, could not fully avail itself of such short periods of hot sunshine. A less pronounced melanism, or tendency to dark coloration, is often observed in Lepidoptera found in very damp localities, and many species, which in their markings imitate moss and lichens, are more vividly coloured in wet than in dry localities. This is, I think, due to the darkening of the tree-trunks, and the more luxuriant growth of lichens and mosses induced by an almost constant and heavy rainfall, the protective colouring of the moths being correspondingly modified to meet the special environment. These conditions are, in fact, fulfilled on the West Coast and in the extreme South of New Zealand. A similar darkening has been observed amongst Lepidoptera taken near the great manufacturing towns in England, where the tree-trunks are darkened by deposits of smoke, the colouring of the moths having also darkened in order to afford them the needful protection. It is obvious that a light-coloured insect on a dark tree-trunk would be at once detected and destroyed, and that the darker forms alone would survive.

Certain special markings near the extremities of the wings, in some species of butterflies and moths, are probably not merely ornamental, but subserve a useful purpose by inducing an enemy to seize a non-vital part of the insect, the victim thus escaping with the loss of an insignificant portion of its wing. The eye-like mark on the short tail of the hind wing of *Dodonidia helmsi* is probably a special marking of this kind as, when the butterfly is resting, it roughly suggests the insect's head, the real head, of course, being in a very different position. In several species, belonging to the genus *Erechthias* and its allies, the real head is extremely small, but the apical portion of the fore-wings is bent over and ornamented with an eye-like marking. This causes the posterior extremity of the resting insect to bear the closest possible resemblance to a head but, in the event of an enemy seizing this spurious head, the little moth would inevitably escape with the loss of the tips of its fore-wings. Many similar special markings have been observed, especially in tropical butterflies, and in this connection a careful study of all specimens, whose

wings have been mutilated under natural conditions, is very desirable, and might lead to the discovery of the uses of many wing-markings which are at present unknown.

In the case of butterflies frequenting hot, arid localities, the shadow of the insect is often more conspicuous than the creature itself, and any reduction in the size of the shadow would be beneficial in helping the butterfly to escape detection by its enemies. Many observations appear to indicate an instinctive habit amongst some butterflies to incline their wings at such an angle to the sun as to reduce the shadow to a minimum. Further investigations are required on this interesting subject, and might be pursued with advantage in connection with several of our New Zealand species.

The habit followed by many larvae of lowering themselves from the branches of trees into mid-air, whilst suspended by a silken thread, and ascending to their original position when the danger is past, has no doubt proved a useful expedient in enabling the insect to avoid destruction by birds. I have also seen a larva escape from the attack of an ichneumon fly by the same method.

In New Zealand it has been observed that in the majority of cases Lepidoptera emerge from the pupa two or three hours after sunset. Hence the process of expanding and drying the wings is completed during the hours of darkness, and the insect is fully matured and ready for flight before day-break. It is probable that this habit has been acquired through Natural Selection as it is obvious that the soft, newly emerged, helpless imago would, if visible in full daylight, fall a very easy victim to birds. No protective colouring for its concealment is available before the wings themselves are fully expanded and sufficiently rigid to assume a natural position, neither can the newly emerged insect escape from an enemy by flight. It would thus appear that emergence early in the night, affords the species an easy method of avoiding the manifold dangers which beset it during the initial period of imago life. I am indebted to Mr. R. M. Sunley for directing my attention to this interesting subject.

For the superficial resemblances, which frequently exist between insects having no real relationship, the term *Mimicry* is used. This is a much more subtle means of protection than any previously considered, and on this account its real significance is still sometimes doubted. In the most simple cases of mimicry we find a harmless, edible, or defenceless species, closely resembling another species having a nauseous taste, or armed with a sting, or some other effective weapon of defence. Simple mimicry of this description is called *Batesian Mimicry* from its discoverer H. W. Bates. Its origin can be traced to the operation of natural selection, as it is clearly an advantage for a harmless insect to resemble one, either possessing a nauseous taste, or armed with a sting, and any variations tending in such a direction would be continually improved, through the preservation of those forms, which most closely approximated, in general appearance, to the specially protected

model. The best example of this form of mimicry amongst our New Zealand Lepidoptera is *Declana glacialis* which, as Mr. Philpott has pointed out, closely resembles in its general appearance the members of the genus *Metacrias*. There is little doubt that these insects are specially protected from the attacks of birds by a nauseous taste, and as they inhabit the same localities as *D. glacialis* it seems fairly certain that the resemblance would be of material advantage to that species and is a case of true Batesian Mimicry. It is also possible that *Dasyuris partheniata* to some extent mimics the general appearance of a *Metacrias*. In 1879, Fritz Müller pointed out, that the approximation of large numbers of species of nauseous, or well-armed insects, to a common colour pattern, would be of great mutual advantage, as young birds would learn to avoid one general pattern much quicker than they would if each specially protected species had a different pattern. It is also equally clear that any mimicking species would benefit if it also approximated to the same general colour scheme. Hence have arisen those large associations of insects belonging to different orders, or families, which are now so well-known to naturalists, especially in the tropics. All the members of these associations superficially resemble each other, and are mutually protected by certain species in the association having an evil reputation, through the possession of a virulent sting, or a nauseous flavour. Such groups of insects have been called Müllerian Associations, and the class of mimicry existing between their members, Müllerian Mimicry. In New Zealand we have a very interesting association of small moths, whose wing-markings resemble, in a most striking manner, those of a certain section of the genus *Glyphipteryx*, of which *Glyphipteryx zelota* may be regarded as typical. The following species, not in any way closely related to *Glyphipteryx*, may be mentioned as conforming to the wing-pattern referred to:—*Protosynaema eratopis*, *Orthenches glypharcha*, *Eugennaea lacquearia*, *Archyala halisparta*, *Tinea margaritis*, *T. fagicola*, *T. accusatrix*, *T. sphenocosma*, *T. astraea*, *T. cymodoce*, *T. aetherea*, *Astrogenes chrysographa*, *Micropardalis dorozena*, and *Sabatinea calliarcha*. In all these species the resemblance is unmistakable, and the cilia around the apex of the fore-wings are, in some cases, specially coloured and arranged to increase the resemblance, the actual wing-outline being often quite different to that of a true *Glyphipteryx*. It seems almost certain that *Glyphipteryx* is a protected group, and in some way distasteful to enemies. I have personally found that the flavour of *Glyphipteryx zelota* is like that of castor oil, and all collectors know to their cost that species of *Glyphipteryx* rapidly corrode ordinary pins, such corrosion frequently spoiling valuable specimens. It is therefore something more than mere conjecture to regard those Lepidoptera resembling *Glyphipteryx*, as constituting a true Müllerian Association, recalling in miniature, one of those larger associations which have been proved to exist amongst tropical insects.

Certain general resemblances in colour and wing pattern, between widely different species, have arisen as the result of parallel adaptations, but these are quite distinct from true mimicry. We have, for example, the blue-grey colouring in several Noctuids (*Aletia griseipennis*, *A. moderata*, *Phyetica caerulea* and *Melanchra phricias*); in *Dichromodes sphaeriata* and *Xanthorhoe orophylla*; in *Crambus xanthogrammus*; *Scoparia asaleuta* and *S. cataxesta* in *Gelechia lithodes* and *Simaethis microlitha*, each specially adapted for purposes of concealment on bluish-grey rocks, or amongst stones; again the banded light-brown and silvery-white colouring of *Selidosema aristarcha* and *Tortrix torogramma*, both so admirably protective amongst the fronds of the silver tree-fern (*Cyathea dealbata*). The vivid black and white colouring of *Declana atronivea* and *Izatha picarella*, affords both these insects protection amongst black and white lichens, besides breaking up the outline of the moth and thus inducing invisibility. The mottled brown and white colouring on the wings of *Scoparia aspidota*, several species of Tortrices, and in most of the members of the genus *Trachypepla* clearly imitate bird droppings and thus efficiently protect their possessors from destruction. Again *Erana graminosa*, several species of *Chloroclystis*, *Talosoma agrionata* and *T. tipulata*, *Hydriomena callichlora*, *Xanthorhoe beata*, *Lysiphragma mixochlora*, and many other species very closely resemble patches of moss, and the imitators of dead and dying leaves are too numerous to specify. The resemblance between the different species in all these cases is due to the insects frequenting the same natural situations. They are protectively coloured, in a similar manner, for purposes of concealment in an identical environment.

Notwithstanding the pressing exigencies of the struggle for existence, which has brought about, through natural selection, innumerable adaptations in form and colour subservient to the preservation of each species, it is clearly evident that, in most cases, beauty is combined with utility in a remarkable manner, and this becomes more evident the closer we examine the objects of our study. Such an insect as *Trachypepla curyleucota* which, at a superficial glance, resembles in the closest possible manner a small bird-dropping, is found, on a closer scrutiny with a lens, to possess a wing pattern of considerable complexity and great beauty, and similar examples might be multiplied indefinitely. The tendency towards beauty, and elaborate ornamentation and adornment, appears to be followed to the utmost limits of safety, and the element of beauty is nearly always present in each class of protective or aggressive colouring. It is thus practically impossible to draw the line between ornamental and useful colouring, the two always co-existing as far as circumstances permit. The upper sides of most butterflies are chiefly ornamental in their colouring, the necessary protection being nearly always afforded by the pattern on the under side. In the case of birds and butterflies, the male is often, though by no

means always, more beautifully coloured than the female, the sexual differences in this respect being sometimes very pronounced. An enormous amount of evidence on this subject is given by Darwin in his work on the "Descent of Man," where it is pointed out that ornamental structures and markings have been gradually produced by the females always pairing with the most attractive males, the less attractive males thus failing to leave offspring. This principle is termed Sexual Selection, and although somewhat ignored by modern naturalists, has unquestionably exercised a profound influence on the evolution of species. The courtship of insects is often a very prolonged affair, in which several males take part, but only one is selected, and it is not to be supposed that such a selection, extending over an indefinite number of generations, has not exercised a potent influence on the race. No hypothesis apart from sexual selection can adequately explain the extraordinary structures and markings we observe in so many male insects, and it may safely be said that many structures, at present quite inexplicable, would receive an intelligible explanation were the principle of sexual selection more fully taken into account. Opponents to the theory of sexual selection consider that an impossible amount of *intelligent discrimination* is assumed on the part of the female insect in order that she may be competent to select the most beautiful, or it may be the most bizarre male. The question, however, is not one of intelligence at all, but of sexual emotion. The well-known fact that man himself is seldom influenced by *intelligence*, in matters connected with the mating of the sexes, should be a sufficient answer to such an objection. Attention was first directed by Fritz Müller to the remarkable scent organs present on the wings of many male Lepidoptera, which are unquestionably used to attract the female, and have arisen through the operation of sexual selection. Such scent organs exist in many of our Native Lepidoptera; notably on vein 2 of the hind wing of the male of *Danaïda plexippus*, and on the coastal fold in the males of *Erana graminosa* and *Rhapha scotosialis*. These organs usually consist of a fold, or pocket, in the wing, containing a large pencil of hair-like scales. The exact scent is sometimes difficult to detect or describe, but

an attempt should always be made to do this. In *Erana graminosa* the perfume resembles vanilla.

In certain species of moths the females are wholly, or more frequently, partially apterous. In most of those wholly apterous the power of walking has almost been lost as well as that of flight, and it was suggested by Dr. Chapman that by this means the female is compelled to deposit her eggs on, or in the cocoon, which appears to be always present in those species having wholly apterous females. It is further assumed that the cocoon provides the most suitable nidus for the eggs and young larvae. Most of the species with semi-apterous females appear in winter, or early spring, and it is possible the abortion of the wings may have taken place in order to prevent the female straying from the foodplant, and perishing from cold before laying her eggs. Dr. Chapman pointed out that a winged female (in winter) would be unable to "scent" the proper food plant owing to the absence of any distinctive odour in cold weather, and considered that the loss of flight in winter species has been beneficial on this account. It is noteworthy that the foodplants of moths with apterous, or semi-apterous females, are common and widely distributed plants, so that the females' disability to seek out the foodplant by flight is not a material disadvantage.

Many species of butterflies which pass through more than one generation in the course of a year exhibit two distinct varieties, the spring form and the summer form. This phenomenon, which is of frequent occurrence in the North Temperate Regions, is called seasonal dimorphism. The summer form is supposed to have originated when the climate ameliorated at the close of the last glacial epoch, the spring form representing the species as it existed during the cold period, when the summer only allowed time for the production of a single brood in the year. Similar dimorphism exists in the tropics in connection with wet and dry season forms. No instances of seasonal dimorphism have been observed in New Zealand at present, but the question is of special interest as it may throw some light on the existence of a glacial period in this part of the world.

CHAPTER V.

CLASSIFICATION, NOMENCLATURE AND GENERAL REMARKS.

If we admit the principles of organic evolution briefly explained in Chapter IV., it is clear that all existing species must have descended by true generation from pre-existing species, and that all the relationships we observe between organisms are explained by community of origin. The most natural system of classification is therefore one which reveals most clearly the scheme of descent, or the phylogeny of the group of organisms classified. In consequence, however, of the great number of species which are at present unknown to naturalists, and the greater number which have become extinct, the problem of framing, even approximately, a phylogenetic system of classification is one of very great difficulty, and the conclusions of even the most experienced workers must, therefore, be accepted with a considerable amount of reservation.

In considering the value of characters for purposes of classification, those which are constant and prevalent are of the greatest importance, especially if they have no direct bearing on the welfare of the species. Adaptive characters, or those which have been much modified by natural selection, are of little value as they necessarily fail to indicate real relationship. Thus in the cases of mimicry, already considered, adaptation through natural selection has brought about numerous superficial resemblances between species of insects which have no real affinities.

It is in consequence of the illusive nature of these external resemblances amongst different members of the *Lepidoptera*, that the structure of the neururation of the wings is of such great importance as a character for purposes of classification. Except where the shape of the entire wing has been modified the numerous variations in the positions of the veins and their presence or absence in certain groups can, so far as we are able to see, have had very little effect on the well-being of the insects possessing them. Hence it may fairly be assumed, that these structures have been free from the influence of natural selection for a very lengthened period and it is thus contended that the neururation of a Lepidopterous insect probably reveals, more plainly than any other character, its true relationship with other species.

As already indicated resemblances between all organisms are explained by community of origin, the amount of difference representing the amount of modification and expressible in the classification as varieties, species, genera, families, orders, &c. The amount of difference does not necessarily bear any direct relation to time, many forms remaining almost stationary whilst others are undergoing development.

By a consideration of the following laws, which are generally recognised by systematists, the age of a division

can be approximately arrived at; that is to say, its position in the great genealogical tree of life can be, to some extent, determined:—

“(1) No new organ can be produced except as a modification of some previously existing structure;

“(2) A lost organ cannot be regained;

“(3) A rudimentary organ is rarely redeveloped.”
—(Meyrick).

As an example of the application of the above principles, I have much pleasure in quoting the following interesting remarks by Mr. Meyrick, respecting the origin of all the *Lepidoptera* from some ancient member of *Trichoptera* or Caddis-flies:—

“There can be no doubt that the section comprising the two families *Hepialidae* and *Micropterygidae* is the ancestral group of the *Lepidoptera** from which all others have descended; this is sufficiently proved by the existence of the four or more additional veins in the hind-wings of that group, for these veins, if not originally present, could not have been afterwards produced. Of the two families of that group, the *Micropterygidae*, which possess an additional vein (or veins) in the fore-wings, and fully developed six-jointed maxillary palpi, must be more primitive than the *Hepialidae*. Now if the neururation of the whole of the *Lepidoptera* is compared with that of all other insects, it will be found that in no instance is there any close resemblance, except in the case of the *Micropterygidae*; but the neururation of these so closely approaches that of certain *Trichoptera* (caddis-flies) as to be practically identical. The conclusion is clear, that the *Lepidoptera* are descended from the *Trichoptera*,** and that the *Micropterygidae* are the true connecting link. If the other marked structural characters of the *Micropterygidae* are taken into consideration, viz., the possession of the jugum, the large development of the maxillary palpi as compared

*At the present time some entomologists have adopted two main divisions for the *Lepidoptera*:—

1. The Homoneura, including those species in which the neururation of the fore- and hind-wings are practically identical; and
2. The Heteroneura, including those in which the fore-wings have 12 veins and the hind-wings 8 veins.

No doubt this division of the order, which has long been recognised, is a natural one, and of considerable phylogenetic significance, but it is of little practical use in classifying the order as a whole, seeing that such a vast preponderance of the species belong to the Heteroneura. The Homoneura are exactly equivalent to the *Micropterygina* of Meyrick, and the Heteroneura to the rest of the *Lepidoptera*. See Handbook of British *Lepidoptera* (1895) pages 12 and 797.

**That is from some insect which, if now living, would be classed as *Trichopterous*.

with the labial, and the sometimes functionally active mandibles, they will be all found commonly in the *Trichoptera*, affording additional confirmation.”*

In the present work I have not employed the divisions, formerly called groups, with their titles ending in *-ina*, but have somewhat extended the scope of many of the families, and adopted the terminations *-idae* or *-adae* for the names of these divisions. Families, if large, are divided into several *sub-families*, with their names ending in *-ides* or *-ades*,† and are in many cases equivalent to the *families* of other authors who use groups.‡ The *sub-families* consist of a variable number of genera, and the genera again of an equally variable number of species. A species may be defined as an assemblage of individuals having a number of characters in common and freely breeding together. Many species are very variable, but their varieties are always continually fertile if paired together. Thus when two different varieties freely pair together, and their offspring are mutually fertile, it is usually considered that their specific identity is proved.

The classification here adopted is in the main that given by Mr. Meyrick in his revision of the various groups of the Lepidoptera, which have appeared in the volumes of the Transactions of the New Zealand Institute.** In order, however, to bring the value of the divisions termed “Families” in closer equality with the families in other orders of insects, such as the Coleoptera, I have, as already explained, converted those divisions designated by Mr. Meyrick as “Groups” into “Families,” and most of his “Families” into “Sub-families.” This has enabled me to adopt the older and more generally known names for the families, and it is thought that this course will be found more convenient by the majority of entomologists. It is also hoped that some degree of permanence will be secured by the use of major divisions which have already stood the test of time.

In the structural descriptions of genera, etc., which have in almost every instance been taken from Mr. Meyrick’s works, proportional measurements are sometimes briefly expressed in numbers as follows:—Ciliations of

the antennae are measured in terms of the breadth of the stalk, thus “ciliations $\frac{1}{2}$ ” means “ciliations half as long as the antennal stalk is broad”; the length of the antennae is expressed in terms of the length of the fore-wings, thus “antennae over 1” means “antennae longer than fore-wings”; the length of the palpi is expressed in terms of the breadth of the eye, thus “palpi $2\frac{1}{2}$ ” means “palpi two and a half times as long as the eye is broad”; the length of the tarsus is expressed in terms of the length of the tibia, thus “tarsus $1\frac{1}{2}$ ” means “tarsus half as long again as the tibia”; the outer spurs of the tibiae are expressed in terms of the inner, thus “outer spurs $\frac{3}{4}$ ” means “outer spurs three-quarters of the length of the inner”; the breadth of the hind-wings is expressed in terms of the fore-wings, thus “hind-wings 1” means “hind-wings as broad as fore-wings”; the length of the cilia of the hind-wings is expressed in terms of the breadth of the hind-wings, thus “cilia 6” means “cilia six times as long as the hind-wings are broad.” In describing the veins, they are assumed to be all present and separate, except so far as they are expressly mentioned to be otherwise. Generally, the absence of peculiar characters is assumed unless they are mentioned as present.*

In the specific descriptions, the expansion of the wings is given in inches or fractions of an inch, taken from a specimen of average size, set in the usual way. Unless specially mentioned, it is to be assumed that the colour of the head and thorax is the same as that of the fore-wings, and the colour of the abdomen the same as that of the hind-wings. In all cases the description proceeds from the base of the wing to the termen, and the positions of the various markings are indicated in terms of the distance from the base to the apex, or from the base to the tornus. Characters of special importance for the identification of the species are printed in italics.

In regard to the vexed question of the specific identity of allied forms, I have, in all cases where the insects are known to me, only regarded those forms as distinct, where their distinctness is fully comprehensible and is capable of clear definition in a figure or description. Mr. Meyrick points out that the New Zealand fauna contains an exceptional number of obscure species, whose slight and elusive differences do not provoke suspicion; whilst, on the other hand, there are very variable species whose forms exhibit much greater apparent diversity.† Again Darwin explains that it is all important to remember that naturalists have no golden rule by which to distinguish species and varieties; they grant some little variability to each species, but when they meet with a somewhat greater amount of difference between any two forms, they rank both as species, unless they are enabled to connect them together by the closest intermediate gradations.‡ These facts should be borne in mind by those who may, at times, be discouraged, by the

*Handbook of British Lepidoptera, p. 12. See also Chapter XIX in the present work.

†The termination *-ides*, for the names of sub-families, has been in general use amongst most entomologists since 1840, and, despite “conference decisions,” there does not appear to be any valid reason for changing it.

‡Most of the divisions ranked in this work as “Families” would be designated by the American entomologists “Super-families,” having the termination “*-oidea*.” Thus the Americans would speak of the superfamily *Noctuoidea* and so on.

**Revision of the classification of the New Zealand *Tortricina*. Trans. N.Z. Inst., XLIII, 78.

Revision of the classification of the New Zealand *Caradrinina*. Trans. N.Z. Inst., XLIV, 88.

Revision of the classification of the New Zealand *Pyralidina*. Trans. N.Z. Inst., XLV, 30.

Revision of New Zealand *Tineina*. Trans. N.Z. Inst., XLVII, 205.

Revision of New Zealand *Notodontina*. Trans. N.Z. Inst., XLIX, 248.

*Handbook of British Lepidoptera, 15.

†Trans. N.Z. Inst., XLVI, 101.

‡Origin of Species, Sixth Edition, 260.

difficulties which they will encounter in apprehending some of the species named and described by modern systematists.

The frequent changes made in the nomenclature of species and genera of Lepidoptera often prove a serious obstacle to the student, but unfortunately such changes are usually unavoidable. This was very clearly explained by Dr. Longstaff* as follows:—"Here I would put in a word of encouragement to those who, like myself, are not systematists, and are, naturally enough, much put out by the changes of nomenclature that are nowadays so frequent. The value of a generic name is comparatively small, since genera correspond to the views of naturalists rather than to the facts of nature, and with increasing knowledge the views of naturalists change rapidly. Some divergences of opinion are due to the recognition, or otherwise, of the genera founded by older authors, which may, or may not, comply with our rules of nomenclature. Sometimes it is discovered that the author's type of the genus was a species now recognised as very different in structure from the others included with it. Sometimes a familiar old name is dropped because the type species is clearly congeneric with some earlier-described species. Many changes which seem from a New Zealand or an English point of view to be meaningless are clearly comprehensible when a large fauna is reviewed. In short, generic names have changed, and, troublesome though it be, probably will change again.

"With species, however, the case is quite different. They correspond with natural facts. There will probably always be both the 'splitter' and the 'lumper.' Nevertheless, while it is comparatively unimportant what generic name you use, it is most important, so far as possible, that all should agree as to the specific name. It is, for example, most important that you should all mean the same thing by *vitiosa* Butl., but it matters comparatively little whether you include it in *Melanchnra* or *Morrisonia*."

I may add that, in my opinion, when any name has been in use for over fifty years, and is consequently mentioned in much literature, it is very undesirable to alter it. Unless the resuscitation of a long forgotten name serves some definite purpose, the name which has been fifty years in general use should be retained.

In employing this book for identifying species, the beginner is recommended first to consult the Plates and see if he can find anything at all resembling the species he has, and then to refer to the description for verification. In dealing with variable forms, it is always well to remember that the *shape* of markings is generally far more constant than their intensity, or even their colour.

The purely descriptive portions of the work have been made as brief as possible, but those who desire fuller details may readily obtain them by looking up the original descriptions, which, as far as possible, are referred to under the synonymy of each species.

It should be mentioned that the figures and descriptions in this work have been prepared from nature, independently. This course has been followed so that any character, which may have been omitted from the figure, will not necessarily be wanting in the description.

The figures of neurulation (Plates A.-K.) have all been made from fully denuded specimens examined under the microscope. They are in nearly every instance considerably enlarged. Each drawing has afterwards been compared with Mr. Meyrick's description, and if found to differ, a second examination of the wings has been made with a view of obtaining a reconciliation of results. This, in the great majority of cases, has been arrived at.

The figures on the coloured plates have, as far as possible, been taken from the finest and most distinctly marked specimens obtainable. In those cases where the necessary details could be clearly shown the figures have been drawn to life size, but in other cases they have been enlarged. No attempt has been made to draw the enlarged figures to any definite scale, the amount of enlargement necessarily depending on the size of the insect, the breadth of the wings, and the complexity of the markings. In every enlarged figure the average expanse of the wings, when fully extended, is indicated by a line beneath each figure.*

The figures of larvae and pupae (Plates I.-III.) have been taken from living specimens, and those of eggs (*Frontispiece*) from examples recently deposited.

The times of appearance, given under the heading of each species, cover the period during which the perfect insect may be observed freely on the wing. In the case of the commoner species, stragglers have not been taken into consideration, but with the rarer species it has often been necessary to simply summarize every authentic capture. In some cases there has been a little difficulty in reconciling the dates given by different observers, and apparently the period during which species may be observed is longer in the extreme south than elsewhere. The record of separate observations, in different localities, would have extended this portion of the subject beyond manageable limits, and in difficult cases an effort has been made to fix a good average period, during which the species may be looked for.

Although the information given in respect of the localities and times of appearance of the various species is much more complete than formerly, owing to the greatly increased number of collectors and observers, the records available must still be largely influenced by the habits and locations of individual workers. In connection with localities, it should be pointed out that some species, which are confined to the mountains in the North Island and northern portions of the South Island, descend to the sea level in the extreme south.

*During the process of reproduction a very slight reduction has been made in the dimensions of some of the plates. This has resulted in some of the life-size figures being a little below the average in size, and the same slight variation may apply to the scale in respect of the enlarged figures.

*Trans. N.Z. Inst., XLIV., 108.

CHAPTER VI.

THE BUTTERFLIES.

The Rhopalocera, or Butterflies, may be readily distinguished from the rest of the Lepidoptera, by the antennae, which terminate in a more or less abrupt knob and are without pectinations, projecting processes or conspicuous arrangements of cilia. The hind-wings are without a frenulum, but the costal vein is strongly curved at the base.

From their diurnal habits and brilliant colouring, butterflies have always been great favourites with beginners, and their obvious attractions have no doubt been responsible for the creation of many entomologists. These beautiful insects attain their maximum development in the tropics, especially in South America, where, it is said, a single valley sometimes contains as many species as the whole of Europe. Notwithstanding its sunny climate, New Zealand is, however, singularly poor in butterflies, only fifteen species occurring in these islands. Compared with this it is interesting to observe that sixty-eight species of butterflies are found in Great Britain, about three hundred in Europe, and no less than seven hundred in the Palaearctic Region. It has also been estimated that about thirteen thousand species of butterflies are already known in the world, and Dr. Sharp considered that there might be nearly twice as many still awaiting discovery. It is, however, unlikely that any very important additions will be made to the butterfly fauna of New Zealand, as these insects are always most assiduously looked for by collectors and, with the exception of the detection of the very widely distributed *Danaida chrysippus*, no fresh discoveries have been made for a period of over 45 years.

The wings of butterflies are generally held erect in repose, the under surface of the hind-wings, and the apical portion of the under surface of the fore-wings, being nearly always protectively coloured, these being portions of the wings exposed to view when the insect is at rest. There is an unusual amount of ornamental colouring on the upper surface. The larva has ten prolegs.

The two following families of butterflies are represented in New Zealand:—

1. NYMPHALIDAE. 2. LYCAENIDAE.

Family 1.—NYMPHALIDAE.

In this family the front pair of legs are much reduced in size in each sex, their tarsi in the male with but one joint, though in the female there are usually five, but without any claws. The fore-wings have veins 8 and 9 out of 7

and the hind-wings are furnished with a præcostal spur. (Plate B., figs. 7, 8, 25, 26, 27.) The pupa is suspended by the tail so as to hang down freely. Three sub-families are represented in New Zealand:—

1. DANAIDES. 2. SATYRIDES. 3. NYMPHALIDES.

Sub-family 1.—DANAIDES.

Fore-wings with vein 1 with a short fork at the base. Cell of the hind-wing closed. Anterior tarsus of female ending in a corrugate knob. Larvæ smooth, provided with a few long, fleshy processes. Only one genus occurs in New Zealand.

Genus 1.—DANAIDA, Latr.

Eyes glabrous. Club of antennæ elongate, gradual. Fore-wings with vein 10 separate. Hind-wings with transverse vein present. (Plate B., figs. 7 and 8, neurulation of *D. plexippus*.)

A genus of moderate extent, generally distributed within the tropics, with two or three species ranging beyond them. Imago with termen of fore-wings sub-concave. Larva with pairs of long tentacles. Both larva and imago are protected by a strong nauseous smell, or taste, and are uneatable to birds.

We have two species in New Zealand.

DANAIDA PLEXIPPUS.

(*Anosia plexippus*, Lin.; *Papilio archippus*, Fabricius, Spec. Ins., p. 55, n. 243 (1781); *Danaüs archippus*, Butler, Butterflies of N.Z., Trans. N.Z. Inst. x. 265; *Anosia erippus*, Cramer; *Danaüs berenice*, Fereday, Trans. N.Z. Inst., vi., 183; Colenso, ib. x. 276.)

(Plate IV., fig. 10♂.)

This handsome insect has occurred from time to time at various localities in both the North and the South Islands, but does not appear to be generally common. Particulars of the early capture of this butterfly were thus given by Mr. Enys: "First recorded as a New Zealand insect by Mr. Fereday, in a paper read before the Canterbury Institute, January 2, 1874, and printed in vol. vi. of 'Transactions.' Mr. Fereday received the butterfly from F. H. Meinertzhagen, of Hawkes Bay. Sir James Hector also obtained it in Westland. It has also been caught near Auckland. In vol. xi. of 'Transactions' Mr. F. W. Sturm records that he first saw this insect, or a closely allied one, at the Reinga, up the Wairoa River, Hawkes Bay, December, 1840, or January, 1841. In 1848 he captured a num-

ber at the Waiau, a tributary to that river. Again in 1861 he captured three on the Rangitikei River near Mr. Birch's run. He also records other captures.* About 1868 a long series of this butterfly was taken at Nelson by an unknown collector, and others were seen and taken there by myself in October, 1881; the insect was also bred, by Mr. C. W. Lee, at Wangaihi in 1879. More recent captures are as follows:—In December, 1891, Mr. J. Rutland reported *D. plexippus* as occurring in the Pelorus Valley; in March, 1892, Mr. A. J. Rutherford took a specimen near Otaki, and in April of the same year one was taken by Sir James Hector at Petone. In 1894 Dr. P. Marshall reported the insect as breeding in hundreds, in Wanganui, on plants of a species of *Gomphocarpus* in gardens, but not appearing the following summer. On May 15, 1898, several specimens were captured at the Girls' College, Wanganui. A specimen was observed at Nelson, by the late Mr. Kingsley, on January 6, 1904; and two specimens by Mr. Sherlock, at Thames, about the same time; three specimens at Makara Beach, near Wellington, in May, 1906, and one on Wellington wharf; one specimen, taken at Otahuhu in 1908, is in Mr. E. S. West's collection; another was seen in Wellington, by Mr. Bakewell, early in May, 1909; further examples at Long Acre, Wanganui, by Mr. Hesse, in 1911; at Thames about the same time, and at the Chatham Islands by Miss Shand. In 1917 two specimens occurred in the Hutt Valley, one taken by Dr. C. M. Hector on 5th October, and another seen by Mr. Creagh O'Connor on 14th October; on the same day a further specimen was seen, by Mr. T. C. Cockcroft, in Gollan's Valley; one specimen was detected by Commander S. C. Paterson, at Whangarei, in December, 1923; one by Mr. C. W. Palmer, at Miramar, near Wellington, at the same time; another by school children, at Motunui, 15 miles from New Plymouth, on February 7, 1924; one seen by Miss Castle, in Sydney Street, Wellington, in December, 1925, and another by Mr. C. W. Palmer, at Miramar, in February, 1926. From these records it will be seen that the insect was observed in New Zealand as early as 1840, and has been met with at irregular intervals ever since, but in recent years apparently less frequently, a corresponding decline in numbers having been observed in many of the Pacific Islands, visited by Mr. C. L. Collenette, in 1924 and 1925.† These facts have more than a purely local interest, for, as pointed out by Commander J. J. Walker, in his most interesting account of the geographical distribution of *Danaida plexippus*, its arrival in New Zealand, about 1840, seems to have been the earliest definite evidence of its occurrence outside the American Continent‡ In the same paper Commander Walker records that the butterfly reached Hawaii about 1845; Caroline Islands, 1857; Tonga, 1863; Azores, 1864; Samoa, 1867; Rarotonga, 1869; Tahiti, 1870; Brisbane,

1870; Melbourne, 1872; Britain, 1876; New Caledonia, 1881; Society Islands, 1883; Spain, 1886; Canary Islands, 1888; and France in 1897. The record of the spread of this butterfly, almost within living memory, may be regarded as one of the most interesting facts in insect migration actually known to us, and is attributed to the artificial dispersal of its foodplant by human agency, the butterfly itself having migrated by means of its powerful flight aided by the elements, its habit of congregating in great swarms and strong migratory instinct assisting. *Danaida plexippus* is a member of an old world genus, and it is considered probable that the butterfly originally reached North America by way of the Aleutian Islands, possibly soon after the close of the glacial epoch.

The expansion of its wings is from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches. Above, all the wings are rich orange-brown bordered with black; the veins are also black. There are two rows of small white spots round the margins of all the wings, and several orange-brown spots near the apex of the fore-wings. Beneath, the markings are similar, except that the white spots are larger, and the hind-wings are very pale yellowish-brown. The male has a black chitinous scent pocket on vein 2 of the hind-wings which is wanting in the female; the wing-veins in the male are also slightly narrower.

The larva of this insect feeds on most of the different kinds of milkweed (*Asclepias*), and also upon dogbane (*Apocynum*). The following account of its habits is taken from Professor Riley's "Third Annual Report of the Noxious, Beneficial, and other Insects of the State of Missouri," supplemented by accounts by Messrs. Scudder and Frohawk:—

The egg is usually deposited on the under side of a leaf, and is conical and delicately reticulate, with about twenty longitudinal ribs, and many fine transverse striæ. It is yellowish when first deposited, but becomes grey as the embryo within develops.

In about five days after laying the egg hatches, and the young larva as soon as hatched usually turns round and devours its egg-shell—a custom very prevalent with young caterpillars. At this stage it differs considerably from the mature larva; it is perfectly cylindrical, about 0.12 inch long, and of much the same thickness throughout. The head is jet black and polished; the colour of the body is pale greenish-white, with the anterior and posterior horns showing as mere black conical joints, and with two transverse-oval black warts, nearer together, on the first joint. It is covered with minute black bristles, arising from still more minute warts.

When the young larva is three or four days old a dusky band appears across the middle of each joint, and by the fifth or sixth day it spins a carpet of silk upon the leaf, and prepares for its first moult. After the first moult the anterior horns are as long as the thoracic legs, the posterior ones being somewhat shorter; the characteristic black stripes show quite distinctly, but the white and yellow stripes more faintly. After this it undergoes but slight change in appearance, except that the colours become brighter, and that at each successive moult the horns become relatively longer. There are four moults, and the intervals between them are short, as the larvæ frequently acquire their full growth within three weeks from hatching.

The full-grown larva is about $2\frac{1}{2}$ inches in length. The head is smooth and rounded, yellow, conspicuously banded with black. The body is cylindrical, tapering slightly at each end,

* "Catalogue of N. Z. Butterflies," 21.

† Ent. Mo. Mag., LXI, 198.

‡ Ent. Mo. Mag., L, 181 et seq.

naked, but furnished with two pairs of long and very slender thread-like filaments; one pair the longer on the third segment, the other on the twelfth segment. The body is white, with numerous black and yellow transverse stripes, repeated with considerable regularity on each of the segments so that there are nowhere any broad patches of one colour.

When the larva is full grown it spins a little tuft of silk to the under side of whatever object it may be resting upon, and after entangling the hooks of its hind legs in the silk it lets go the hold of its other legs and hangs down, with the head and anterior joints of the body curved. In this position it hangs for about twenty-four hours, during which the fluids of the body naturally gravitate towards the up-turned joints, until the latter become so swollen that at last, by a little effort on the part of the larva, the skin bursts along the back behind the head. Through the rent thus made the anterior portion of the pupa is protruded, and by constant stretching and contracting the larval skin is slipped and crowded backwards until there is but a small shrivelled mass gathered around the tail. Now comes the critical period—the culminating point.

The soft and supple chrysalis, yet showing the elongate larval form with distinct traces of its prolegs, hangs heavily from the shrunken skin. From this skin it is to be extricated and firmly attached to the silk outside. It has neither legs nor arms, and we should suppose that it would inevitably fall while endeavouring to accomplish this object. But the task is performed with the utmost surety, though appearing so perilous to us. The supple and contractile joints of the abdomen are made to subserve the purpose of legs, and by suddenly grasping the shrunken larval skin between the folds of two of these joints as with a pair of pincers, the chrysalis disengages the tip of its body and hangs for a moment suspended. Then with a few earnest, vigorous, jerking movements it succeeds in sticking the horny point of its tail into the silk, and firmly fastening it by means of a rasp of minute claws with which that point is furnished. Sometimes severe effort is needed before the point is properly fastened, and the chrysalis frequently has to climb by stretching the two joints above those by which it is suspended, and clinging hold of the shrivelled skin further up. The moment the point is fastened the chrysalis commences, by a series of violent jerkings and whirlings, to dislodge the larval skin, after which it rests from its efforts and gradually contracts and hardens. The really active work lasts but a few minutes, and the insect rarely fails to go through with it successfully. The chrysalis is a beautiful object, and as it hangs pendant from some old fence-board or from the under side of an *Asclepias* leaf, it reminds one of some large ear-drop; but, though the jeweller could successfully imitate the form, he might well despair of ever producing the clear pale-green and the ivory-black and golden marks which so characterize it.

The pupa is pale green, stout, being largest in the middle of the abdomen, where it is transversely ridged; elsewhere it is smooth and rounded, with no striking prominences, but with little

conical projections at most of the elevated points, like those which half encircle the body at the abdominal ridge. All these are of a golden colour, except those on the abdominal ridge, which are situated in a tricoloured band, black in front, yellow in the middle, and gilt behind.

The chrysalis state lasts but a short time, as is the case with all those which are known to suspend themselves nakedly by the tail. At the end of about the tenth day the dark colours of the future butterflies begin to show through the delicate and transparent skin, and suddenly this skin bursts open near the head, and the new-born butterfly gradually extricates itself, and stretching forth its legs and clambering on to some surrounding object, allows its moist, thickened, and contracted wings to hang listlessly from the body.

The perfect insect appears from January until May, specimens being also met with in the spring. It is a most striking species on the wing, and one which, when once seen, is not likely to be forgotten.

DANAIDA CHRYSIPPUS.

(*Danaida chrysippus*, Linn., Kirby European Butterflies and Moths, 26; *Limnas chrysippus*, Huds., Trans. N.Z. Inst., XL, 104.)

(Plate IV., fig. 11 ♀; 12 under side.)

Mr. Edwin C. Sherlock informed me that in March, 1904, a boy captured a specimen of this butterfly about four miles from Thames. Mr. Sherlock at once visited the locality, and was fortunate enough to see another, but he could not capture it. Since this time one has been taken at Auckland, two at Wanganui, and one at Nelson.

The expansion of the wings is almost 3 in. The fore-wings are bright orange-brown, darker towards the costa, and very broadly bordered with black at the apex, tapering off at the tornus; there is a number of clear white spots near the apex. The hind-wings are paler orange-brown, with three obscure brownish-black spots near the middle, and a broad black terminal band containing one or two paler spots. On the under side the fore-wings are very broadly shaded with rich blackish-brown; there is a large patch of dull greenish-yellow above the white spots near the apex. The hind-wings are bright ochreous-yellow with a black border, containing numerous white spots, and three central black marks bordered with white.

This species somewhat resembles *Danaida plexippus*, but may easily be distinguished from that insect by its smaller size and by the veins on the upper side of the fore-wings not being marked in black. It occurs throughout Australia, Africa, Western Asia, the East Indies and Greece.

Described and figured from the specimen kindly lent to me by Mr. Sherlock.

Sub-family 2.—SATYRIDES.

Palpi strongly pressed together, set in front with long, stiff hairs. Fore-wings frequently with one or more of the veins swollen or bladder-like at the base of the wing. Cells of both wings closed. (Plate B., figs. 25, 26, 27.) Larva thickest at the middle, the hind end of the body bifid. Pupa generally suspended by the cremaster, without girth but sometimes terrestrial.

A large group of very general distribution. The species are usually of moderate size, generally dark coloured with light bands or spots, and with several round, black, white-centred spots on lower surface. Some of them are more fond of shady places than is customary amongst butterflies. The larvæ feed on grasses.

Of this sub-family we have three genera represented in New Zealand:—

1. ARGYROPHENGA. 2. DODONIDIA. 3. EREBIA.

Genus 1.—ARGYROPHENGA.

Eyes glabrous. Club of antennæ somewhat abrupt. Forewings with lower margin of cell greatly dilated towards base; veins 8, 9, 10, and 11 out of 7; vein 12 greatly dilated towards base.

Of this genus there is one species in New Zealand, confined to the South Island. Two other species, as well as two species belonging to the closely allied genus *Argyrophorus*, occur in the mountains of Chili.

ARGYROPHENGA ANTIPODUM, Doubleday.

(*Argyrophenga antipodum*, Doubleday, Ann. and Mag. Nat. Hist. xvi., 307 (1845); Gen. Diurn. Lepid., pl. 63, fig. 6 (1851); Butler, Erebus and Terror Lep., pl. 8, figs. 4, 7 (1874).

(Plate IV., fig. 6 ♂, 7 ♀ Dun Mountain form; 13 ♂, 14 ♀ mountain form from Canterbury and Otago; 18 under side, 19 ♂, 20 ♀, Canterbury and Otago lowland form; Frontispiece, fig. 2 egg; Plate I., fig. 8 larva, 9 pupa.)

This species occurs commonly on the tussock lands from Christchurch to Invercargill. In the provinces of Nelson and Marlborough it is, I believe, confined to situations having elevations of from 2,000 to 4,000 feet above the sea-level. It has never been captured in the North Island.

The expansion of the wings varies from 1½ to 1¾ inches. Above, all the wings are dull brown, paler near the body; the outer portion of each is covered with a large patch of bright orange-brown (northern form), or fawn colour (southern form); on the forewings this patch contains a large oval black spot, with two white dots in the middle; on the hind-wings there are two, three, or four black spots, with one white dot in the centre of each; beneath, the markings on the forewings resemble those of the upper surface, except that there are often several short silvery stripes near the apex; the hind-wings are dull yellow, with silver streaks between the veins, and one broader streak in the centre of the wing. The female is much paler than the male, with the borders of the wings whitish.

This insect is extremely variable. The colouring appears to be much influenced by local conditions. On the Dun Mountain, Nelson district, at an elevation of about 2,700 feet, a very small light form occurs in which the sexes are almost exactly alike. There are only two perfect spots on the upper surface of the hind-wings; the other spot is rudimentary, and has no white central dot. On the under side there are no silver stripes near the apex of the forewings, and only five or six silver stripes on the marginal portions of the hind-wings (see Plate IV., figs. 6 and 7). At Kekerangu, on the "Chalk Range," at an elevation of from 3,000 to 4,000 feet, a similar but slightly larger form occurs. On the Tableland of Mount Arthur, Nelson dis-

trict, 3,600 to 4,600 feet above the sea-level, the females are paler than in either of the preceding forms, and the males darker, so that the sexes are well marked; but there are no silvery stripes on the under side of the apex of the forewings, and usually only five stripes on the marginal portions of the hind-wings. Finally, in the Awatere, Canterbury, Otago and Southland butterflies (southern lowland form), we have the large, very dark reddish-brown coloured male insect with large ocelli, and the extremely pale yellow female with small ocelli, the two sexes here exhibiting the greatest differentiation. On the under side, the male has several small silver stripes near the apex of the forewings, and seven stripes on the marginal portions of the hind-wings. (See Plate IV., figs. 18, 19, and 20.) In elevated situations in Canterbury, Otago and Southland, however, somewhat similar varieties occur to those found on the mountains in Nelson and Marlborough, but the butterflies from the southern mountains are usually larger in size. (See Plate IV., figs. 13, 14.)

Besides these general variations, which appear to be largely dependent on local conditions, great individual variability exists with respect to the number and size of the ocelli or white-centred spots. In some specimens there are no ocelli on the hind-wings; in others, two, three, or four very minute ones, whilst others have all four very large. Occasionally specimens have a minute ocellus below the large one on the forewings. Were it not for the intermediate varieties, there would probably be little hesitation in separating the extreme forms of this insect into several distinct species; but as they are connected by a host of intermediate forms, it is quite impossible even to divide them into varieties.

The egg is cylindrical, abruptly truncated above and rounded beneath, very pale ochreous-brown irregularly mottled with warm brown; there are about sixteen prominent, whitish, longitudinal ribs.

The larva, when first hatched, is about $\frac{3}{16}$ inch in length. The head is very large, pale, pinkish straw-colour, with two long, and about eight short, stout, black bristles. There is a row of black bristles around the second segment. The body gradually tapers towards the tail and is pale pinkish straw-colour. There is a broad, brown, darker-edged lateral line, and fine, brown dorsal and sub-dorsal lines. The terminal segment is slightly bifid and furnished with numerous, rather long bristles. The food-plant is tussock-grass (*Poa caespitosa*).

The full-grown larva is about 1 inch in length. The top of the head is furnished with a very large process, which projects forwards. The body is much attenuated towards the tail, which is bifid. The general colour is green, darker on the lateral and ventral regions; there are broad, yellowish-green dorsal and lateral lines and several very fine lines between these. The legs and prolegs are very small. There are four wrinkles on the posterior edge of each segment, and the whole larva is covered with very fine greenish hairs, giving the insect a somewhat velvety appearance. Some larvæ are pale brown, with the principal lines finely margined in reddish or darker brown.

When feeding, this caterpillar rests on a blade of the tussock, where it is very inconspicuous. It appears to prefer the dead or drier portions of the grass, and feeds and

grows very slowly. It is strictly diurnal in its habits, relapsing into a death-like repose at night.

The pupa is suspended by the tail to an upright blade of the tussock. In one of the specimens I reared, I was fortunate enough to witness the actual transformation, and during the process, observed it seizing hold of the larval skin with its posterior segments, its manœuvres whilst thus engaged resembling those of the pupa of *Danaida plexippus*, already described.

The length of the pupa is about $\frac{3}{4}$ inch. Its colour is bright green, with a brown line along the edge of each wing-case, and several white lines on the sides and back. Sometimes the pupa is pale brown with the edge of the wing-case and margins of the white lines darker brown.

The perfect insect appears from the middle of November until the end of March. It is usually very abundant where found, the males being more numerous than the females in the proportion of about five to one. It flies amongst the tussock grass in a weak and aimless manner. When rapidly pursued it has a habit of plunging into a tussock and closing its wings, where it remains quite invisible until the danger is past.

The silver stripes on the under side of the hind-wings are very protective to the insect when at rest on its food-plant, the striped coloration of the larva and pupa serving similar protective purposes.

Genus 2.—DODONIDIA, Butl.

Characters as in *Argyrophenga*, except that vein 11 of the fore-wings rises from upper margin of cell, shortly before transverse vein.

We have one species in New Zealand.

DODONIDIA HELMSI.

(*Dodonidia helmsi*, Fereday, Trans. N.Z. Inst., xv., 193 (1882).) (Plate IV., fig. 16 ♂; fig. 17 under side; Plate I., fig. 3 larva, fig. 4 pupa.)

This interesting butterfly was discovered by Mr. R. Helms, in 1881, on the Paparoa Range, near Greymouth, at an elevation of about 1,500 feet above sea-level. Since that time it has occurred in certain restricted spots at Whangarei, Waitakerei (near Auckland), Thames, Mangatopopo stream (near Mount Ruapehu), Wanganui, Tararua Ranges, Silverstream, and on the eastern side of Wellington Harbour, in the North Island; at Picton, on the Dun Mountain, on Maungatapu, and the Mount Arthur Tableland, near Nelson; also on the Humboldt Range at the head of Lake Wakatipu, in the South Island.

The expansion of the wings is from 2 to 2 $\frac{3}{4}$ inches. On the upper side all the wings are dark brown. The fore-wings have two broad bands of yellowish-orange, the outer one containing a small patch of dark brown near the costa, which touches a white-centred black ocellus. The hind-wings have one large patch of yellowish-orange containing two ocelli; a large ocellus, surrounded by a broad ring of reddish-orange, is situated on the tornus; the tornus is produced into two very broad but short tails, which are bordered with white cilia. On the under side the fore-wings are light ochreous-yellow; there is a shaded brown patch

at the base; the termen is broadly bordered with brown, the border containing a silver streak; two broad brown patches are situated on the costa, the outer one terminated by a small ocellus, and enclosing a silvery patch near the apex of the wing. The hind-wings are silvery, narrowly bordered with deep reddish-brown, with five deep reddish-brown stripes running from the costa towards the tornus; the fourth stripe from the base of the wing contains three ocelli surrounded by yellow rings; a conspicuous ocellus is situated at the tornus, surrounded by a broad orange-red ring.

This insect appears to vary a little in the extent of the yellowish-orange colouring of the upper side. It also varies in size, specimens from the North Island being usually slightly larger than those from the South Island.

The larva feeds on a species of sedge (*Gahnia setifolia*), which always grows abundantly in the beech forests, where the butterflies are found. When full grown the length of this caterpillar is about 1 $\frac{1}{4}$ inches. Its body is much attenuated at each end and rather stout in the middle; the head and tail are bifid; there are numerous straight, shallow, transverse wrinkles on each segment, especially towards the head. The colour is green, with a number of fine, paler and darker green, dorsal and lateral lines; the head and thirteenth segment are yellowish. The legs are very minute, and the prolegs of moderate size. It is extremely susceptible to the attacks of a Dipterous parasite. This larva feeds on the leaves of the sedge, eating out long notches parallel to the veins of the leaf. These notches are the best guides to follow in searching for the larva, as the colouring of the caterpillar renders its discovery amongst the food-plant extremely difficult. The larvæ should be looked for during November and December.

The pupa is rather stout, light green or greenish-brown, with the edge of the wing-case and the prominences formed by the back and palpi edged with dull crimson and white. It is suspended by the tail to any firm object in the neighbourhood of the sedge.

The perfect insect usually appears in January and February. It is on the wing for a very short period, and this fact may account for its apparent rarity. It frequents sunny glades in the beech forest, often at considerable elevations above the sea-level. This butterfly is very difficult to capture, as it has a most provoking habit of resting on the foliage of the beech trees, just out of the collector's reach.

The rough resemblance to an insect's head of the short tail and accompanying ocellus, on the under side of the hind-wings of this species, has already been referred to.

Genus 3.—EREBIA, Dalm.

Eyes glabrous. Club of antennæ abrupt. (Plate E., figs. 25, 26, and 27 neurulation of *Erebica pluto*.)

An extensive and essentially Alpine genus inhabiting the mountains of Europe, Asia, North America, and South Africa. Pupa unattached amongst stem bases of grass. An allied form occurs in Chili.

We have two species in New Zealand, both confined to the South Island.

EREBIA PLUTO.

(*Erebia pluto*, Fereday, Trans. N.Z. Inst., iv., 217; ib., xii., 265, pl. ix., 2; *Erebia merula*, Hewitson, Ent. Mo. Mag., xii., 10 (1874); *Oreina othello*, Fereday, Trans. N. Z. Inst., viii., 302, 304, pl. ix. (1876); *Pernodaimon pluto*, Butl., Ent. Mo. Mag., xii., 153 (1876); Catalogue of N. Z. Butterflies, 10.)

(Plate V., fig. 13 ♂, 30 ♀, 29 under side.)

This fine butterfly has occurred plentifully on many mountain-tops in the South Island, from Nelson to Lake Wakatipu. It has never been observed in the North Island.

The expansion of the wings of the male is 1½ inches, of the female 2 inches. On the upper side all the wings are a very rich bronzy-black. The fore-wings have a paler patch near the apex, containing two small, and three large black ocelli with white centres; these ocelli are usually joined together. On the under side all the wings are considerably paler and greyer. The hind-wings have a series of pale spots near the termen, and a paler shade across the middle.

This insect varies chiefly in the number of ocelli. On the upper side of the fore-wings there are sometimes only four, the minute ocellus on the costa being absent, whilst occasionally a small extra ocellus appears below the normal series. On the under side this last-mentioned ocellus is very frequently, but not invariably, present. In some female specimens an extremely minute ocellus may be detected on the upper surface of the hind-wings near the termen. On the under side of the hind-wings in both sexes the series of pale terminal spots is often absent, and the general depth of the colouring varies considerably. Generally speaking, specimens from the southern mountains are considerably larger and darker in colour than those from the Nelson Province. A very small and extremely dark form, with many golden scales on the under side of the hind-wings, was, however, discovered by Mr. Harold Hamilton, on the upper Arrow River, and on Mount Hyde, at an elevation of about 6,000 feet above the sea-level. This form was described by Mr. Augustus Hamilton as *Erebia pluto* variety *micans**. In addition to these colour varieties, a most interesting structural variation often occurs in this species, vein 11 of the fore-wings sometimes running into 12 and sometimes being entirely absent. (Plate B., figs. 25, 26.)

The perfect insect appears from December till March, and it is quite possible that there is more than one brood in a season. It frequents shingle slopes on mountains, at elevations ranging from 4,000 to 6,000 feet above the sea-level. Sometimes the butterflies occur in considerable numbers, flying in a lazy, aimless manner in the scorching sunshine, but instantly retreating into crevices between the stones when the sun is obscured. I have observed that this species is most abundant in the neighbourhood of the carpet grass (*Poa colensoi*), on which I fully anticipate its larva feeds. It seldom, however, settles on this grass, pre-

ferring to alight on the shingle, which, owing to the rarefied air existing at such high elevations, soon becomes intensely heated by the sun's rays.

When disturbed this insect flies with considerable rapidity and thus often eludes the net, so that the capture of a good series of specimens on a rugged mountain-slope is usually very exciting, if not actually dangerous work. As with many other alpine insects, mountain ranges are more prolific in this butterfly than isolated peaks. This species has, on one or two occasions, occurred in river-beds amongst the mountains at elevations of about 2,500 feet. Its occurrence at such a low altitude must, however, be regarded as very exceptional.

EREBIA BUTLERI.

(*Erebiola butleri*, Fereday, Trans. N.Z. Inst. xii. 264; Catalogue of N.Z. Butterflies, 19.)

(Plate IV., fig. 3 ♂, 4 ♀, 5 ♂ underside.)

This interesting butterfly was discovered by Mr. John D. Enys at Whitcombe's Pass, Canterbury, on March 8, 1879, at an elevation of about 4,000 feet above the sea-level. Since that time it has been taken in considerable numbers on the Humboldt Range, at the head of Lake Wakatipu, and on the high grassy country around Lake Harris, as well as on Mount Earnslaw and Mount Cook. It is, however, a very much rarer and more local species than *Erebia pluto*.

The expansion of the wings of the male is 1½ inches, of the female 1½ inches. On the upper side all the wings of the male are smoky-brown; the fore-wings have a large black ocellus near the apex, enclosing two white dots, followed by a smaller ocellus towards the dorsum; the hind-wings have three black spots near the termen, sometimes enclosing white dots. Occasionally these ocelli are surrounded by a patch of deep reddish-brown. The female is much paler, with large patches of yellowish-brown surrounding the ocelli. On the under side the fore-wings of the male are smoky-brown, with an irregular blotch of reddish-brown near the apex, surrounding a small white-centred black ocellus. The hind-wings are dark reddish-brown, with several conspicuous black-edged silvery markings, and four yellowish-red spots near the termen. The under side of the female is very much paler.

This butterfly varies considerably on the upper side in the number and size of the ocelli, and in the extent of the reddish-brown markings which surround them; on the under side the silvery spots on the hind-wings are also variable.

The perfect insect has been taken in January and March. It evidently frequents mountains in the South Island, at elevations of about 4,000 feet, but does not appear to be generally distributed in such localities. It seldom settles on the shingle, mostly resting on the mountain grasses, on which its larva probably feeds. It is a smaller insect than *E. pluto*, and flies much more feebly. These characteristics will at once enable the collector to distinguish it from *E. pluto* when on the wing.

Immediately a cloud obscures the sun these butterflies retreat into the grass tufts, remaining closely hidden

* Trans. N. Z. Inst., xli., 47.

there until the sun shines out again. This circumstance makes the capture of the insect, even in a favourable locality, a matter of considerable uncertainty, as bright sunshine is more often the exception than the rule on the slopes of high mountains.

Sub-family 3.—NYMPHALIDES.

Cells of both fore- and hind-wings either closed only by imperfect transverse veins or entirely open. Anterior tarsus of the male unjointed and without spines, of the female four or five jointed. Larva either spined or smooth; in the latter case the head more or less strongly horned or spined and the apex of the body bifid.

This sub-family comprises our most beautiful butterflies. It is represented in New Zealand by the three following genera:—

1. HYPOLIMNAS. 2. PRECIS. 3. VANESSA.

Genus 1.—HYPOLIMNAS, Hübn.

Antennae not quite half the length of costa. Eyes smooth. Forewings with vein 10 from sub-costal just before end of cell; cell less than half the length of wing and closed, with lower and upper edges of about equal length. Hindwings with cell much less than half the length of wing and closed; veins 3 and 4 arising from almost the same point; termen rounded.

Represented in New Zealand by the wide-ranging *H. bolina*.

HYPOLIMNAS BOLINA.

(*Diadema nerina*, Butler, Butterflies of N.Z., p. 13. Female. —*Papilio nerina*, Fabr., Syst. Ent., p. 509, n. 277 (1775); Donovan, Ins. of New Holland, pl. 27, fig. 1 (1805). *Papilio iphigenia*, Pap. Exot., 1, pl. lxvii., figs. D, E, (1775). Var. *Papilio proserpina*, Cramer, Pap. Exot., 3, pl. ccxviii., figs. C, D, (1782). Male ? *Papilio auge*, Cramer, Pap. Exot., 2, pl. cxc., figs. A, B (1779).)

(Plate V., fig. 18 ♂, 19 ♀.)

This fine species appears to be rare in New Zealand, but I think it has occurred often enough to entitle it to a place amongst our native butterflies. It is, however, perhaps doubtful whether the insect actually breeds in this country as so many of the recorded specimens have been found on the sea coast. The following is a list of the captures so far as I am able to ascertain them:—

From Mr. Eny's 'Catalogue of New Zealand Butterflies'* the first specimen taken in the Dominion appears to have been a male, which was captured by Dr. Sinclair, of Auckland, and sent to the British Museum before the year 1855. The Rev. Richard Taylor also caught one male specimen in his garden at Wanganui, and saw another, the only two he observed in thirty-four years. Dr. Baker saw one in his garden at Christchurch on lilac flowers, also a male. A specimen was taken at Nelson about 1868. Mr. R. W. Fereday† records the capture of the first female specimen by a son of Mr. Thomas Tanner, near Napier, in January, 1876; on the 18th of March, 1885, Mr. R. I. Kingsley‡ took a fine female specimen in Nelson, and on the 25th of

March, 1886, I saw another female specimen in the same locality. A male was taken at Wanganui on May 15th, 1898. About three years later quite a number of specimens were taken in the neighbourhood of Auckland, and single specimens at Nelson, and at Ohau, in the Manawatu district, more recent captures include a fine series taken by the Rev. Alex. Doull, at Otahuhu, in 1904, to whom I am indebted for specimens, and a specimen at Silverstream, Hutt, by Mr. A. P. Buller. In the same year Mr. Ritchings Grant reported the occurrence of *H. bolina* at Wanganui in March, and Mr. R. I. Kingsley stated he had seen seven specimens at Nelson and heard of others. Mr. E. C. Sherlock also observed several specimens of this butterfly, in 1904, at the Thames. In 1907, Mr. Leslie Roskrug stated that he had seen the butterfly near the Government Buildings, at Wellington, and Mr. Bannehr observed one in Cuba Street about the same time. Mr. Herbert W. Williams reported, that on March 12th, 13th, and 14th, 1908, he observed thirteen specimens of this insect, whilst travelling from Hick's Bay to Opotiki. The Maoris from Hick's Bay had not noticed the butterfly before, but the specimens from near Opotiki had been seen a few days prior to Mr. Williams' visit. The track mostly follows the sea coast, but in some places turns inland. All the butterflies, but one, were observed on the sea face, and most within about 100 yards of the sea itself. On April 25th, 1909, a female *H. bolina* was taken resting on a tree at Karori, and a male was seen at Paekakariki on the same day. On March 20th, 1911, a female specimen was taken by Mr. Hesse at Wanganui, and two others seen by Mr. Morris N. Watt about the same time. In 1916 or 1917 a male specimen was seen by Selwyn Woodward at Karori. On May 5th, 1918, Mr. F. de J. Clere took a female specimen at the Lower Hutt and, during the same month, Mr. D. Miller observed a male and female at Weraroa, and two females and a male at Foxton. A female specimen was taken at Motunui, Taranaki, in 1924, and one at Ikamatua, near Greymouth, in June of the same year. In January and February, 1925, several specimens occurred around Nelson.*

From the irregular nature of these occurrences, it may, I think, be assumed that, so far as New Zealand is concerned, *H. bolina* is an occasional immigrant, and is not yet permanently established in the country.

The expansion of the wings of the male is $3\frac{1}{2}$ inches, of the female 4 inches. On the upper side all the wings of the male are rich brownish-black, with a large white blotch in the middle of each, surrounded by a patch of brilliant flashing blue; there is also a small white spot near the apex of the fore-wings and a series of white crescent-shaped markings on the termen of all the wings. The fore-wings of the female are brownish-black, with a patch of deep orange-brown near the tornus; there is a series of four very large oval white spots on the costa, beyond the middle, a smaller white spot near the apex, and three rows of small white marks parallel to the termen; the hind-wings are

* 'Cat. N.Z. Butterflies,' p. 22.

† 'Trans. N.Z. Institute,' ix. 463.

‡ Ibid. xviii. 205.

* New Zealand Journal of Science & Technology, vii., 365.

brownish-black, with a broad white band across the middle, several small white spots, and a double series of white markings parallel to the termen; all the wings of the female have brilliant bluish reflections near the white spots. On the under side the wings of both sexes are rich brown with white markings, and a double series of white crescents on the termen.

The female appears to be very variable in almost every respect.

Mr. W. W. Froggatt informs me that in Australia the larva of *H. bolina* feeds upon *Sida rhombifolia* and *S. retusa* (Paddy's lucerne) as well as on various species of *Portulacae*. The light green, fluted eggs are deposited in patches on the underside of the leaves of the food plant. The larvae, when first hatched, congregate together, and are green with the head black. The full-grown larva, as observed in the Marquesas Islands, is thus described by Commander J. J. Walker:—

Length from $1\frac{1}{2}$ to more than 2 inches: Cylindrical, rather stout, a little attenuated in front. Head a little larger than second segment, deeply bifid at top, and bearing, on each lobe, a long blackish spine pointing upwards and a little forwards: colour light reddish-brown or burnt sienna. Body deep brownish-black, with a rather well defined, irregular, sub-spiracular, longitudinal stripe on each side, light burnt-sienna colour: legs and prolegs of the same tint. Segments 3 to 12 bear eight ochreous-orange, slightly-branched spines about $\frac{1}{2}$ inch long, rigid and somewhat irritating when handled: segment 2 has only two short spines on either side. Spiracles black, surrounded with ochreous-yellow. The pupa, which is suspended by the tail, is stout: palpi-cases rather distinct, front of thorax very convex, with a strong, toothed, lateral crest. Abdomen very stout and rather abruptly truncated, bearing five longitudinal rows of sharp pointed tubercles, the outer ones only distinct on the anterior segments. Anal appendage rather short and stout. Colour dark, dull, umber-brown, irregularly blotched with a lighter and more ochreous tint, especially on the wing-cases.*

The perfect insect appears from January till May. From its large size and brilliant colouring it is easily recognised. Although rare in New Zealand, it is very common in Australia. It also occurs in Java, New Guinea, the Loyalty Islands, Fiji, Polynesia, and throughout the Oriental region. A smaller representative is found in Samoa (*Hypolimnys otaheiteae*, Feld.), which is probably only a variety of this species.

Genus 2.—PRECIS, Hübn.

Eyes glabrous. Club of antennae abrupt. Fore-wings, with vein 10 separate. Hind-wings with transverse vein, absent between veins 4 and 5.

We have one species in New Zealand.

PRECIS VELLEDA.

(*Junonia vellea*, Fabr. *Man. Insect.*, 35, 1787.)

(Plate IV., fig. 15, ♀.)

This butterfly was very common throughout the Wellington district during the summer of 1886-87, but to

the best of my knowledge the insect had not previously been observed in New Zealand. Mr. R. Holloway informed me that he met with it on the sea coast near New Plymouth, in 1893, and at Motueka in 1898. Since then Mr. Harold Hamilton captured a single specimen on Mount Greenland, in March 1910, and another specimen was seen by Mr. Howes at Dunedin, in 1918. In 1922 and 1923, Mr. Philpott and Mr. W. Wastney observed the insect in Nelson, and in 1924 quite a number of specimens were detected by Mr. Grimmer in the same locality. Finally Mr. Ferguson records the occurrence of *Precis vellea* at Tutukaka, Whangarei, in the late summer of 1925; the insect was captured by Mr. Gourlay in Nelson at the same time, and Master Clarence Palmer secured a specimen at Cobden, near Greymouth, on January 16th of the same year; a further specimen was taken at Waiuku in September.

The expansion of the wings is nearly 2 inches. On the upper side all the wings are dull blackish-brown, with greenish or bronzy reflections. The fore-wings have two broad orange-brown stripes on the costa, and a very large patch of the same colour along the termen, containing a large black spot with a bluish-white centre; there are three irregular whitish marks near the apex of the wing, and a minute blue-centred ocellus. The hind-wings have two very large orange-brown spots almost touching each other near the termen; each of these contains a large blue-centred ocellus in the middle; there are also two terminal rows of brown crescent-shaped markings. Underneath, the markings of the fore-wings resemble those of the upper side, but they are very much paler, and the ground colour is light brown. The hind-wings are pale brown, with a wavy black line across the middle, followed by a brown shading towards the termen; there are also four small round black spots and a series of irregular black dots near the termen.

The perfect insect occurred very plentifully in December, 1886, and January and February, 1887. It was fond of settling on barren, stony places in the hot sunshine, and was very timid and difficult to catch, darting off with great rapidity when approached. During that season I managed to secure about nine specimens, some of them in very good condition. I am unable to explain the sudden appearance of this butterfly in New Zealand at that time. The large numbers, which were observed over extended areas, could not have been due to accidental importation from Australia, and we must therefore assume that its advent was the result of extensive immigration. It is, however, remarkable that the butterfly was not observed in this country before 1887, and that it has been so seldom seen since. This may, however, be due to its superficial resemblance to *Vanessa cardui*, for which it might readily be mistaken when flying. On this account it is very desirable that entomologists should endeavour to detect and record all appearances of *Precis vellea* in the future.

This butterfly has a very wide geographical range, being found in Java, Sumatra, Tasmania and all parts of the Australian Continent. About the year 1830 it was described by Stephens, in his 'British Entomology,' under the name of *Cynthia hampstediensis*, on account of its

*Trans. Ent. Soc. Lond., 1923, 649, 650. This description appears in a most interesting article, by Prof. Poulton, F.R.S., entitled "Mimicry in the Butterflies of Fiji." Much information is here given relative to *H. bolina* in Fiji and Polynesia, together with a series of beautiful coloured plates, illustrating its life history and variation.

having been taken at Hampstead, the well-known suburb of London. Subsequently it transpired that the specimen in question was no doubt of foreign origin, its "appearance" having been due to a practical joke perpetrated on the British Lepidopterists of the day.

Genus 3.—VANESSA, Fabr.

Eyes hairy. Club of antennae abrupt. Fore-wings with vein 10 separate. Hind-wings with transverse vein present.

A moderate genus, principally characteristic of the Northern Hemisphere. Larva with six or seven rows of bristly spines. Pupa with angular prominences, often with golden metallic spots.

Of this very beautiful and interesting genus we have three species in New Zealand.

VANESSA GONERILLA.

(*Papilio gonerilla*, Fabricius, Syst. Ent. p. 498, n. 237 (1775); Donovan, Ins. New Holland, pl. 25, fig. 2 (1805). *Vanessa gonerilla*, White in Taylor's New Zealand, pl. 2, fig. 1 (1855).)

(Plate IV., fig. 9 ♀, 2 under-side; Frontispiece, fig. 1 egg; Plate I., figs. 11-13 larvae, 14 pupa; Plate V., fig. 31 under-side Chatham Island form.)

This handsome insect is the most familiar of New Zealand butterflies. It is very common and generally distributed throughout the country.

The expansion of the wings varies from about $2\frac{3}{4}$ to $2\frac{1}{2}$ inches. Above, all the wings are black, becoming bronzy towards the body. The fore-wings have a band of dark red nearly across the middle, and a series of three small blue spots, and three larger white spots near the apex. The hind-wings have a broad dark red band near the termen, containing two pairs of black spots with blue centres. On the under-side the fore-wings are dark brown, with a broad patch of red in the middle, and a very conspicuous eye-like mark on the costa, consisting of a black central spot surrounded by a blue ring, and encircled by a yellow crescent towards the termen. The hind-wings are brownish-grey, with many darker and paler markings; the four spots on the upper surface are faintly indicated on the under-side by blackish rings and central dots; the colouring of the under-side varies a good deal. It is considerably darker and duller in some specimens than in others.

The egg, which is deposited upright, singly on the under-side of a nettle-leaf is barrel-shaped, ornamented with a series of nine prominent longitudinal ribs meeting in a central spot on the top; there are numerous fine, transverse, striae between the ribs. It is dark green, with the ribs white. The young larva, when hatched, is dusky-yellow, with the spines black. In about a week it moults for the first time, and is then of an almost uniform brown, with the lateral lines faintly indicated. Ten days later it again sheds its skin, after which time the white lateral markings are considerably stronger. The length of the full-grown larva is about $1\frac{1}{2}$ inches; its general colour varies from black to brown or pale reddish-brown with the ventral surface green and the whole surface closely freckled with numerous minute, dull, whitish dots; there is a rather fine, broken, white sub-dorsal line; a broad rather wavy white lateral line with a fainter broken line above it; on the third and fourth segments there are four spines; on the fifth to twelfth seven spines and on the thirteenth four spines; the spines vary from pale green to black; the larva is considerably attenuated at each end, its central portions being somewhat swollen.

This caterpillar constructs for itself a small tent by fastening together several of the leaves of its food-plant. In this dwelling it can feed, safely concealed from all enemies. There are two kinds of nettles constituting the food of this insect—one a small plant, which generally grows in little patches amongst ferns in the forest (*Urtica incisa*), the other a large shrub or tree often found in rather open situations (*Urtica ferox*). The shrub is easily recognised by the formidable array of long, white spines which project from the midrib of each leaf. The larvae of *V. gonerilla* are much more easily collected on the tree nettle than on the dwarf species; their leafy tents being easily detected by an examination of the foliage. When once discovered the larvae are best obtained by cutting off, with a pair of strong scissors, the leaves which form their habitations. Like most larvae of the genus *Vanessa*, these caterpillars are extremely voracious and soon eat themselves out of house and home. Those feeding on the tree nettle have an unlimited supply of leaves available both for food and shelter, but in the case of larvae, which are dependent on the dwarf nettle for their supplies, no doubt individuals must occasionally die of starvation, as we sometimes observe large patches of the *Urtica incisa* completely destroyed by the larvae of this butterfly. These larvae may sometimes be found in the late autumn or winter, and are often common as early as the middle of September, continuing abundant until the middle or end of February.

When full grown, this caterpillar suspends itself by the tail to a little patch of silk, which it has spun on the under side of a leaf, having also drawn two or three other leaves around it in the same way as the feeding larva. In this situation it hangs, with the head and three anterior segments slightly curved upwards, for nearly twenty-four hours before the transformation to the pupa state occurs. I have often watched these larvae changing, and as their manoeuvres during the process exactly resemble those of *Danaida plexippus* a special description is unnecessary. The actual transformation may be easily observed in this species, as the larvae are common and can be obtained in large numbers. It is well worth watching, and if a good many specimens are kept at once, some of them are sure to change at a convenient time for observation. The pupa varies from pale yellowish-brown to dark purplish-brown, darker on the wing-cases and ventral surface. The spines on the back are golden. The whole insect is also speckled with brown or black dots. The pupa varies considerably in size as well as in colour. In this insect the pupa state is of very short duration, usually only lasting about a fortnight. Mr. Helms informed me that the pupa of *Vanessa gonerilla* is often destroyed by the common Hemipteron, *Cermatulus nasalis*, which penetrates its shell by means of its long rostrum, and speedily consumes the liquid internal portions.

The perfect insect usually emerges early in the morning. It dries its wings for a few hours whilst resting on the old nettle-leaves which formed its home when a larva.

The increasing warmth of the sunshine soon hardens the wings sufficiently to allow the new-born butterfly to fly away.

This insect is very common in most situations from January till April. It lives through the winter, appearing again on fine days towards the end of August. During the spring and early summer these hibernated individuals occur in great profusion, a few specimens always remaining until the earliest of the new ones have emerged; so that about November we may often observe both hibernated and recent specimens together.

In the autumn these butterflies are seen feasting on the flowers of the white rata or scabious, and thus preparing for their long winter sleep. A stray specimen may also sometimes be observed on the wing during very mild, sunny days even in the depth of winter. At this season I have, on one or two occasions, discovered the torpid butterfly, hidden amongst a mass of dry, withered foliage, where it had evidently found a suitable refuge from the elements. In the spring the insect is most abundant in the vicinity of the nettle-plants, where the females are busily engaged depositing their eggs. On one occasion I observed a specimen ovipositing in the autumn.

I have noticed that this butterfly possesses the power of emitting a distinct grating or hissing noise, evidently closely resembling the sound which has been observed to be emitted by several European species of the genus.* This sound is only made when a specimen is roused from a semi-torpid condition; and it is thought that it may be useful to the insect for the purpose of intimidating intruders during its period of hibernation.

This butterfly is a rapid flier and may often be seen pursuing a straight course high above the tree-tops, apparently migrating in search of fresh breeding-grounds. It appears to have a singular liking for hill-tops, and a specimen which has selected one of these places will keep on returning to the same spot, after being repeatedly frightened away. In such situations, if the weather be calm and sunny, we may frequently see two specimens engaged in aerial battle. They fly upwards, and coursing round each other with great velocity, almost disappear in the clear blue sky. A few seconds later the two insects, gently fanning their wings in the warm sunshine, are again seen in their respective places.

This species is also found on high mountains, where I have often observed it between 4000 and 5000 feet above the sea level.

On the Chatham Islands a form of *Vanessa gonerilla* occurs (Plate V. fig. 31), in which the ground colour of the upper side may be very slightly bluer than usual, and the sprinkling of golden scales on base of wings slightly less pronounced. On the underside, the apex of the fore-wings and the whole of the hind-wings are strongly

suffused with bright reddish-brown. The indentations on the margins of the hindwings are also less pronounced than in the typical form of *Vanessa gonerilla*. Mr. C. Lindsay, who recently collected quite a number of these butterflies at the Chathams, informs me that they are much more timid and harder to catch than the ordinary *Vanessa gonerilla*, and that their manner of flight is somewhat different.*

VANESSA ITEA.

(*Papilio itea*, Fabr., Syst. Ent., p. 498, n. 238 (1775); Donovan Ins. New Holland, pl. 26, fig. 1 (1805). *Vanessa itea*, Godart, Enc. Meth. ix. p. 321, n. 57 (1819); White in Taylor's New Zealand, pl. 2, figs. 2, 2 (1855). *Bassaritis itea*, Hubner, Samml. Esot. Schmett. (1816-24). *Pyrameis itea*, Doubleday, Gen. Diurn. Lepid., p. 202 (1849).)

(Plate IV., fig. 8 ♀.)

This beautiful butterfly is fairly common and generally distributed throughout the North Island. At Wanganui, Mr. Drew informs me, it is often as common as *Vanessa gonerilla*, but in the Wellington district it is usually rather scarce. An exception, however, occurred in the autumn of the year 1899, when it was abundant in all the gardens and other open spaces around Wellington, being at that time even commoner than *V. gonerilla*. In the South Island *V. itea* has occurred in the Nelson, Marlborough and Christchurch districts.

The expansion of the wings is from 2½ to 2½ inches. The fore-wings are black, becoming reddish-brown speckled with gold towards the base; there is a very broad yellow band nearly across the middle, and one yellow and two white spots near the apex. The hind-wings are rich reddish-brown, broadly bordered with black, especially towards the costa; there are four small black spots with blue centres near the termen, and a blue stripe bordered with black at the tornus. The under surface closely resembles that of *Vanessa gonerilla*, except that the red patch on the fore-wings is replaced by pale yellow, and the markings on the hind-wings are more sharply defined.

The transformations of this insect very closely resemble those of *Vanessa gonerilla*, the egg, however, has only eight ribs. The food-plant of the larva is stinging nettle (*Urtica incisa*).

The perfect insect appears from November till April or May, hibernated specimens being found early in the spring. It is very fond of selecting a perch on the top of a hill, and often engages in violent encounters with *Vanessa gonerilla*. During the contest both insects course round each other with great rapidity, and generally ascend to a considerable elevation. They almost invariably return to their former resting-places. This is a fortunate habit for the collector, as it frequently enables him to ultimately capture a specimen, which he has almost touched with the net on several previous occasions. I have noticed this propensity to return to a favourite perch in the European species of the genus *Vanessa*, so that it is most likely a congenital habit of immense antiquity.

*See notes by Stainton in the Ent. Mo. Mag., xxv. pp. 225, 268.

**Vanessa ida* ? Alfken, Zool. Anz. xxii. 5. (1899).

This insect has a fine appearance when flying; the large yellow spots on the fore-wings are then very conspicuous, and ensure its immediate and certain recognition.

Beyond New Zealand *Vanessa itea* is found throughout Australia, Tasmania and the Loyalty Islands.

VANESSA CARDUI.

(*Vanessa cardui*, L. *Cynthia kershawii*, McCoy, Ann. and Mag. Nat. Hist. iv., vol. i. 76 (1868). *Pyrameis cardui*, var. *P. kershawii*, Butler, Erebus and Terror Lep., 29 (1874).)

(Plate IV., fig. 1 ♀.)

This elegant butterfly occurs throughout both islands, but is very irregular in its appearance. In some years it is quite abundant, whilst in others scarcely a specimen will be seen. During the summer of 1889-1890 it was extremely plentiful in the Wellington district, being at that time commoner than *Vanessa gonerilla*, but its appearance in such large numbers as this was very exceptional. It is sometimes found on mountains between 5000 and 6000 feet above the sea level.

The expansion of the wings varies from 2 to 2½ inches. Above, all the wings are orange-red, spotted and mottled with black. The fore-wings are bronzy towards the base; in the black apex there are five white spots. Near the termen of the hind-wings three of the black spots have blue centres. On the under side of the fore-wings the markings are very similar to those on the upper side, except that there are several additional white blotches, and the orange-red ground colour has a rosy blush towards the base. The hind-wings are very beautifully mottled with an elaborate series of pale brown, purplish-grey, yellowish-brown, and white markings; three of the large spots near the termen have pale blue centres.

I have not yet met with the larva of this insect, neither can I find any record of its having been observed in New Zealand. The following description by Stainton is taken from a European specimen:—“The spiny larva is brown with two dorsal and two lateral yellow lines; on the third, fourth, and twelfth segments there are four spines; on the fifth to eleventh segments seven spines, and on the thirteenth two spines; it feeds solitarily in rolled thistle-leaves.”

The perfect insect appears in January, February, March and April, specimens which have presumably hibernated occurring from August until December. It is a much more wary butterfly than either *Vanessa gonerilla* or *V. itea*, and can seldom be captured after it has once been disturbed, although it will often return to the same spot several times in succession. In fact, owing to its extreme timidity, its capture is generally attended with some difficulty.

This insect is found almost throughout the entire world. In specimens from the Northern Hemisphere the black spots on the hind-wings have no blue centres, and the butterflies are a little larger than those found in the Southern Hemisphere, otherwise the two insects are exactly

alike. The southern form has been called *V. kershawii* by several writers, but the differences do not appear to be sufficiently important to merit a distinct specific name, especially as both forms occur together in South Africa.

This butterfly has frequently been observed at various places on the European Continent migrating in vast swarms; and it seems probable that its strong migratory instinct may have led to its enormously wide range at the present time. It is possible that some of the specimens of this butterfly, which are occasionally observed in New Zealand during the spring and early summer, are migrants from Australia.

Family 2.—LYCAENIDAE.

Anterior legs developed, but tarsi of ♂ more or less abbreviated, or with one or both claws absent; posterior tibiae without middle spurs. Fore-wings with vein 7 absent, 8 and 9 stalked or coincident. Hind-wings without praecostal spur. (Plate B., figs. 15, 16, neuration of *Chrysophanus salustius*.)

The family is large and very generally distributed. The species are of moderate size or more often rather small, usually blue, dark brown, or coppery-orange in colouring often with series of small black pale-ringed spots on lower surface.

Ovum flattened—spherical or subcylindrical, reticulated and sometimes ribbed, seldom smooth. Larva stout, with few hairs. Pupa attached by tail and a central belt of silk, or sometimes unattached or subterranean.

We have two genera represented in New Zealand, viz. :—

1. CHRYSOPHANUS. 2. LYCAENA.

Genus 1.—CHRYSOPHANUS, Hb.

Eyes glabrous. Club of antennae elongate. Fore-wings with vein 6 separate, 8 and 9 stalked.” (Plate B., figs. 15 and 16 neuration of *C. salustius*.)

An extensive and nearly cosmopolitan genus. Larva short, stout, attenuated at extremities, with short hairs. Pupa attached by the tail and central belt of silk, or sometimes unattached on the ground.

There are three New Zealand species.

CHRYSOPHANUS SALUSTIUS.

(*Chrysophanus salustius*, Fabr.; Syst. Ent. 111, 310 (1793); *Lycaena edna*, Doubl., Dieffenbach's. “New Zealand,” App. 283 (1843). *Polyommatus edna*, Westwood & Hewitson, Gen. Diurn. Lep. Pl. 76, fig. 6 (1852). *Chrysophanus salustius*, Butler, Butterflies of N.Z., Trans. N.Z. Inst. x. 263. *Chrysophanus rauparaha*, Fereday, Trans. N.Z. Inst. ix. 460. *Chrysophanus mauri*, ib. x. 252.)

(Plate V., fig. 7 ♂ coastal form, 8 ♀ ditto; 9 ♀ rare variety; 25 ♂ variety with confluent spots, 24 underside of ditto; 26 ♂ Canterbury form; 27 ♂ Wellington inland form, 28 ♀ ditto, 21 underside ditto; 20 ♀ high mountain form; Frontispiece, fig. 3 egg; Plate I., fig. 1 larva, 2 pupa.)

This brilliant little butterfly is common, and generally distributed throughout the country. It is often extremely abundant around Wellington.

* ‘British Butterflies and Moths,’ p. 103.

The expansion of the wings varies from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. On the upper side all the wings are brilliant shining copper, with black markings. The fore-wings have three black spots near the middle, then a row of black spots, often forming a band nearly parallel with the termen, and another row on the termen, generally touching the narrow black border of the wing. The hind-wings resemble the fore-wings, except that there is only one elongate spot in the centre, and the terminal series of spots is nearly always separated from the black border. In the female the black spots are united and form bands, those on the termen often having violet or blue centres. The veins in both sexes are indicated by black lines, which are often double in the male, when the vein itself is coppery. On the under-side the fore-wings are orange-brown, bordered with yellow; the spots resemble those of the upper-side, except that the terminal series are generally faint or obsolete towards the costa. The hind-wings vary from light yellow to pale dull brown; the spots are dull greyish, the posterior series often having white centres.

From the foregoing it will be seen that the variation in this insect is considerable. After a careful examination of a large number of specimens taken at various localities in both North and South Islands, I am, however, unable to find characters of sufficient constancy to entitle any of the forms to specific rank. One of the most striking of these varieties appears to be that described by Mr. Bates as *Chrysophanus feredayi*.^{*} (See Plate V., fig. 25, upper side; 24, under side.) On the upper surface it has the central series of spots almost forming a band in the male, and the coppery ground colour is paler than in the typical form. On the under side the borders of the fore-wings, and the whole of the hind-wings are dull brown. This form is identical with *C. rauparaha*, Fereday.† *C. mauī*, Fereday, is evidently that variety of the male having very small spots and the veins bordered with two fine black lines. The female of *C. mauī* was never found, but this is readily accounted for by the fact, that the female of *C. mauī* is nothing more than the female of *C. salustius*.

As regards topographical variation, it appears probable that South Island specimens generally have the black borders on both the fore- and hind-wings slightly wider than specimens from the North Island. (Plate V. fig. 26.) Individuals captured on high mountains, between 4,000 and 5000 feet above the sea level, very often have the dark markings faint but much suffused, the whole insect having a more or less dull or dusky appearance, with the coppery colouring often reduced to chains of oblong marks (fig. 20). The forms previously known as *Chrysophanus feredayi*, with the brown or greenish-brown underside to the hind-wings, occur at Auckland and at Nelson, the common forms being found associated with them. Specimens taken on the sea-coast are usually smaller than those found inland, and have the coppery colour yellower and less lustrous; the female of the coastal form nearly always has distinct blue or violet marginal spots. (Plate V., fig. 7 ♂, 8 ♀.)

The small coastal form is also often taken on mountains at considerable elevations. Exceptional aberrations of *Chrysophanus salustius*, differing markedly from the

usual forms, are extremely rarely met with. In some of these the dark markings are very heavy and much suffused, either on both pairs of wings or on the hind-wings only. One very interesting variety having the usual sub-marginal rows of spots absent is represented on Plate V., fig. 9.

The eggs of *C. salustius* are deposited singly on undersides of the leaves of *Mühlenbeckia*. They are hemispherical considerably flattened, bluish-green, and covered with white reticulations, the whole egg having an irregular honeycombed appearance when magnified. They become uniform pale yellow before hatching. The young larva is shaped somewhat like a wood-louse. The head is quite hidden by the three anterior segments, which are much larger than the rest. After the first moult the larva becomes bright green, with a crimson line down the back; the head is then larger, and the three anterior segments considerably reduced. This stage occurs in the late autumn, and the larva then hibernates, coming abroad to feed early in September, and attaining its full size about the end of October. The full-grown larva is five-eighths of an inch in length, elliptical, slightly tapering posteriorly, dark green (not so vivid as the larva of *Chrysophanus cnyssi*); there is generally a darker green, or dull reddish, dorsal line, and a few very obscure greenish, or dull reddish-green marks on each side; under a powerful lens ($\times 10$) the whole surface is seen to be speckled with minute white dots and short reddish bristles.

The pupa, which is about three-eighths of an inch in length, is stout, with the segmental divisions obscure; pale yellow, tinged with green; the wing-cases and thorax are streaked with pale reddish-brown; there is a large crescentic black mark on the eye; an oblong black mark at the base of the wing; seven rows of alternate large and small black dots on each side of the abdomen, these forming a row around each segment. The head, anterior portion, and cremaster are somewhat brownish. There is slight variation in the number of the black spots. The pupa is unattached, resting on the ground amongst dead leaves, etc.

The perfect insect usually appears about the first week in November. It is commonest in January, and continues abundant until the end of March or beginning of April.

Messrs. H. W. Simmonds and R. M. Sunley inform me that in certain restricted spots on the northern shores of Cook Strait, having a very sunny aspect, this butterfly is to be met with all the year round. From this circumstance, and from its continuous appearance for over six months in most localities, it is clear that there must be more than one brood in a season, but I have never been able to discover any line of demarcation between successive broods. I am, however, now satisfied that there is no regular seasonal variation, although I formerly imagined that this existed.

^{*} Ent. Mon. Mag. iv. p. 53. [†] Trans. N.Z. Inst. ix. 460; x. 252.

This butterfly frequents open situations, and in fine, sunny weather it is often very common. The male appears somewhat earlier in the season than the female, and seems to be very much more numerous. In fact, I have, at times, counted as many as fourteen males to one female, but it is unlikely that there is such a great disparity between the numbers of the sexes as this would indicate. The apparent excess of males is most likely largely due to their greater activity.

In places where this butterfly is abundant it is often possible, by means of a lantern, to discover individuals asleep. At such times the insect simply perches amongst foliage with its wings closed, and in this situation the bright yellow colouring of the underside strongly suggests a faded leaf. As the leaves of so many of our native shrubs turn bright yellow before they fall, it is probable that the colouring of the underside of the butterfly is highly protective. Specimens may also be observed at rest on leaves or twigs exposed to the rain. Beyond becoming slightly wet on the head and palpi, the insect escapes any harm, as the water runs off the wings which are held in the usual upright position.

CHRYSOPHANUS ENYSII.

(*Chrysophanus enysii*, Butler, Ent. Mo. Mag. xiii. 153 (1876).)

(Plate V., fig. 10 ♂, 11 ♀, 12 under-side; Plate I., figs. 5, 7, larvæ; 6 pupa.)

Although not nearly so common as *Chrysophanus salustius*, this species is probably generally distributed throughout the country. It has occurred at Palmerston North, Lake Horowhenua and Wellington in the North Island, and at Nelson, Pohorua, near Greymouth, and Lake Wakatipu in the South Island, but apparently it is not found further south than Wakatipu.

The expansion of the wings varies from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. On the upper surface both sexes resemble the female of *Chrysophanus salustius*, except that the dark markings are very much broader, and the coppery colour is paler and less lustrous. On the under-side the fore-wings are pale yellowish-brown, bordered with darker brown, with three black spots near the middle, and a chain of black spots beyond the middle. The hind-wings are yellow, with a very large irregular patch of purplish brown extending over the costal and terminal portions.

The insect varies chiefly in the extent of the dark markings on the upper side, which sometimes very much encroach on the golden ground colour. The spaces between veins 2, 3, and 4, near their origin are sometimes yellow and sometimes black, but, as every intermediate form exists, cannot be distinguished as species. Mr. Fereday regarded the form with the black spaces as *C. feredayi*, Bates. As previously stated, however, I am satisfied that *C. feredayi*, Bates, is the same form as *C. rauparaha*, Fereday. Occasionally specimens are met with having the whole of the underside of the hind-wings clouded with dull brown, but these individuals are always much darker, and have much heavier black markings on the upper side, than any of the varieties of *C. salustius*.

The larva, which feeds on *Mühlenbeckia*, is about half an inch in length, onisciform, very dark, rich green, with a darker stripe down the midback; there are several obscure diagonal markings on each side, and the whole larva is clothed with numerous very minute reddish bristles and many extremely minute yellowish dots. The head and prolegs are very small, pale ochreous, and the spiracles are reddish-brown. Younger larvae are paler green, some with a reddish stripe down the back. The young larvae feed on the green fleshy surface of the leaf, but older larvae devour the edge, eating out excisions in the usual way. This larva is very sluggish in its habits. Immediately prior to pupation it encloses itself in a folded leaf, or between two leaves, and its colour changes to a very dull olive green. The pupa is about three-eighths of an inch in length; very stout, blunt, with the segmental divisions obscurely indicated; dull reddish-brown, speckled with blackish and shaded with very dull greenish-brown on the wing-cases and towards the thorax; there is an obscure row of paler spiracular spots. It is attached by the tail within the leafy tent and sometimes a few silken threads are stretched across its back. The perfect insect appears from the middle of November until the middle of February. Its period of greatest abundance extends from about the third week of December until the third week in January. Young larvae go into winter quarters in the autumn and hibernate, becoming full grown in October, or early in November. At this time stray specimens of the larva may often be beaten from shrubs which are covered with a dense growth of *Mühlenbeckia*. In the neighbourhood of Wellington this butterfly is often very common in sunny glades amongst scrubby forest, but it is very rarely met with in the open country. There appears to be less disparity between the numbers of each sex than in *Chrysophanus salustius*, but from their duller colouring neither of the sexes of *C. enysii* are as conspicuous as the males of *C. salustius*.

CHRYSOPHANUS BOLDENARUM.

(*Lycena boldenarum*, White, Proc. Ent. Soc., Ser. 3, 1, p. 26 (1862). *Chrysophanus boldenarum*, Butl., Zool. Erebus and Terror, Ins. Lep., p. 29, n. 8, pl. 8, figs. 8, 9 (1874).)

(Plate V., fig. 1 ♂, 2 ♀ Mount Arthur form; 3 ♂, 4 ♀ lowland Canterbury form; 5 ♂, 6 ♀ Lake Wakatipu high mountain form; 14 ♂, 15 ♀ Nelson lowland form; 16, 17 under-sides. Plate I., fig. 10 larva.)

This brilliant little butterfly is very common in most localities in the South Island. In the North Island it has occurred at Ohakune, Waimarino, Waiouru, Napier, Rangitikei, Masterton and Lakes Wairarapa and Taupo.

The expansion of the wings is $\frac{3}{4}$ inch. On the upper side the male has all the wings brown, tinged with the most brilliant glistening purple. The fore-wings have two or three black spots near the middle, a curved series beyond the middle, and on the termen. The hind-wings have two black spots near the middle, a series beyond the middle, and a terminal series, sometimes with blue centres. All the wings are narrowly bordered with

black. The female is pale yellowish-brown, the spots resemble those of the male, except that all the marginal series have bright purple or blue centres. On the under-side the fore-wings of both sexes are pale yellowish, bordered with pale slaty-blue; the spots are the same as on the upper-side. The hind-wings are brownish-grey in the male, slaty-grey in the female, the spots of the upper-side being always indicated.

This insect is extremely variable, but none of the numerous forms are sufficiently constant to be regarded as distinct species. The male varies in the size and number of the black spots, many of which are often absent; in the extent of the purple sheen which is sometimes absent from the hind-wings, sometimes partially absent from the fore-wings, and sometimes extends over the whole of both pairs of wings; also in the colour of such sheen, which often inclines towards blue. Some specimens are much paler than others, and so far as my experience goes, these are chiefly found at considerable elevations. In male specimens from the Mount Arthur Tableland, taken at altitudes between 3000 and 4000 feet above the sea-level, the ground colouring inclines towards yellow or orange, and the purple sheen is very brilliant, and extends over the whole of the wings. (Plate V., fig. 1.) The female of this form is proportionately paler, and has a decided resemblance to a diminutive specimen of *Chrysophanus salustius* (fig. 2.).

Butterflies from the high mountains around the head of Lake Wakatipu have the ground colour in the male dull grey, the purple sheen very brilliant and extending almost over both wings (fig. 5.). The female of this variety is pale dusky yellow, with all the dark markings pale and somewhat diffused (fig. 6.). Other specimens from the lowlands have the hind-wings of the male almost black with no purple sheen, whilst in others the purple sheen remains. Another form has the usual markings, but the hind-wings are deep orange-brown, without purple sheen, which is also absent from the outer portions of the fore-wings. One female in my collection is greyish-brown, with yellow markings between the two rows of black spots. The under side is still more variable. One very striking form has only the basal portions of the fore-wings yellow, the rest of the ground colour is pale bluish-grey, and the spots black. On the hind-wings there are a number of black spots near the base; then an irregular band of black, followed by a double row of marginal spots. A very pronounced form of this variety occurs on the elevated tussock plains, in the centre of the North Island (fig. 16.). An almost unlimited number of varieties however connects this extreme form with those in which all the markings on the hind-wings are nearly obsolete. Specimens of this insect taken in separate districts often exhibit differences from those taken elsewhere, but specimens also differ from the same district, so that at present we are unable to detect any definite topographical variation. It is consequently highly desirable that collectors should continue to endeavour to obtain specimens from as many localities as possible, so

that the precise nature of the variation of this butterfly may be better understood.

The larva, which feeds on a small-leaved *Mühlenbeckia*, is about three-eighths of an inch in length, stout, onisciform, with the head very small, dull green or brick-red, with a few oblique dark red or pinkish stripes; the whole larva is covered with numerous long hairs. The pupa is about a quarter of an inch in length, very stout, much rounded, with no angulations; the eyes are brown, the head and abdomen dull red, the wing-cases dull ochreous, the back of the thorax grey, and the spiracles ochreous; there are three rows of blackish dots on the back of the abdomen. The specimen I reared was enclosed in an extremely frail cocoon, formed of a few strands of silk, joining together two or three leaves of the food-plant. Mr. Howes states that the larvae and pupae found by him were discovered under stones, covering ants' nests, in river beds. He suggests that there may possibly be some connection in habits between this insect and the ants, which were observed running over the pupae when they were found.*

The perfect insect is very common from November till March, frequenting dry, stony places, near river-beds. It flies only a short distance when disturbed, but is very quick on the wing, and hence rather difficult to catch until one becomes accustomed to its movements. It seldom opens its wings whilst at rest, so that when perched on the ground it is always very inconspicuous. There are probably at least two broods in a season, and specimens of a late brood may usually be taken, in very fine condition, during the first or second week in March.

Mr. H. W. Simmonds, who has very closely studied our butterflies, has drawn my attention to the very interesting resemblance between the female of *Chrysophanus boldenarum* and *C. salustius*. This resemblance is closest between the female of the Mount Arthur form of *C. boldenarum* and a small coastal form of *C. salustius*, common on the northern shores of Cook Strait, and having marginal spots with blue centres. Mr. Simmonds regards *C. boldenarum* as most nearly approaching the ancestral form of *Chrysophanus* which originally established itself in New Zealand. He considers that this ancestor first separated into *C. boldenarum* and *C. salustius*, these subsequently diverging into varieties of which *C. enysi* is the most permanent.

Genus 2.—LYCAENA, F.

"Eyes hairy. Club of antennae elongate. Fore-wings with vein 6 separate, 8 and 9 stalked.

"A large genus of nearly universal distribution. Imago usually with a horny apical hook on anterior tibiae. Larva short, stout, attenuated at extremities, with short

* Trans. N.Z. Inst., xlii., 206.

hairs. Pupa attached by tail and often a central belt of silk, or unattached or subterranean."—(Meyrick.)

Represented in New Zealand by one very widely distributed species.

LYCAENA LABRADUS.

(*Zizera labradus*, Godt., Ency. Method., 680; 1819; *Lycaena phoebe*, Murray, Ent. Mo. Mag., 1873, 107; *Lycaena oxleyi*, Feld., Reis. Nov., 280, pl. xxxv., 6.)

(Plate V., fig. 22 ♂, 23 under-side.)

This very dull-looking little blue butterfly is extremely abundant in some parts of New Zealand, especially in those localities having a very hot, dry climate. It occurs in great profusion at Kaero, north of Auckland, and in the Nelson district, and may be taken in lesser numbers at many localities in both islands, but seems to be very rare in the extreme south.

The expansion of the wings of the male is 1 inch, of the female $\frac{3}{4}$ inch. On the upper-side all the wings are pale blue,

broadly bordered with dull brown. The cilia are white, faintly barred with brownish. *On the under side all the wings are pale slaty-grey.* There is a faint blackish spot, edged with white, near the middle of the fore-wings, and two rows of similar spots near the termen. The hind-wings have several very faint white edged spots near the base, a row near the middle, and another row almost entirely white near the termen.

A rather small form of this butterfly with the cilia somewhat more strongly barred with brownish and the spots on the under-side darker, has sometimes been regarded as a distinct species, under the name of *Lycaena oxleyi*.

The perfect insect frequents waste grounds and sand-hills, generally beside roads and river-beds, and when found is usually very common. It is on the wing from the beginning of October until the end of March, or even April, being most abundant towards the end of summer. This species is abundant and widely distributed throughout Australia, Tasmania, many South Pacific Islands, Timor, Celebes and India.

CHAPTER VII.

THE SPHINGIDAE.

The Sphingidae, or Hawk-moths, are distinguished by the following characters:—

Head with dense appressed hairs. Ocelli absent. Eyes glabrous. Antennae thickened towards middle or posteriorly, in male ciliated with partial whorls. Labial palpi moderate, ascending, with dense projecting scales. Thorax densely hairy beneath. Femora densely hairy. Fore-wings with vein 1b furcate, 6 out of 8, 9 absent (rarely present in exceptional individuals). Hind-wings with veins 3 and 4 approximated at base, 5 from middle of transverse vein, parallel to 4, 6 and 7 connate or stalked, 8 connected by oblique bar with margin of cell before middle, more or less approximated to 7 near beyond cell. (Plate B., fig. 12, 13.)

The very handsome and conspicuous assemblage of insects comprised in this family is inadequately represented in New Zealand by only two very wide-ranging species. These cannot be regarded as belonging to the original fauna, but must rather be looked upon as immigrants. In Europe and elsewhere the family is represented by many splendid and interesting insects. About sixty species of Sphingidae have been recorded from the Palaearctic Region of which twenty-seven are found in Europe, and of these about ten are true natives of the British Isles.

The Hawk-moths may be readily known by their stout bodies, narrow rigid wings, fusiform antennae, and rapid crepuscular flight. The larvae are distinguished by the presence of a curved horn on the back of the last segment of the body.

Two genera are represented in New Zealand:—

1. SPHINX. 2. DEILEPHILA.

Genus 1.—SPHINX, L.

Tongue strongly developed. Antennae less than one-half, gradually thickened to apex, then pointed, apex slender, hooked. Thorax with low double posterior tuft. Abdomen smooth, broad, conical, pointed. Tibiae with appressed scales.

A moderately large genus, ranging over the whole world, but principally characteristic of America. Imago flying at dusk, feeding on the wing.

This genus is represented in New Zealand by one almost cosmopolitan species.

SPHINX CONVULVULI.

(*Sphinx convolvuli*, L., Sys. Nat. 1, 490; Meyr., Trans. N.Z. Inst., xxii., 213; *roseofasciata*, Koch, Ind. Aust. Lep. 54; *Protoparce distans*, Butl., Cat. N.Z. Lep. 4, pl. ii, 11.)

(Plate VI., fig. 16 ♀.)

This handsome insect often occurs in the northern portions of the North Island, but becomes rare and irregular in its appearance southward of Napier and New

Plymouth. In the South Island it has been taken occasionally at Blenheim, Nelson, Hokitika and Christchurch. In the autumn of 1925 it seems to have been comparatively common as far south as the latitude of Nelson.

The expansion of the wings is about $3\frac{1}{2}$ inches. The fore-wings are grey speckled with darker; there are several irregular darker grey marks near the base and, in the male, a large cloudy blackish-grey costal patch near the middle; there is a faint series of strongly toothed markings beyond the middle. The hind-wings are greyish-black with two cloudy paler terminal and sub-terminal bands. The head and thorax are dark grey, paler on the back. The abdomen is grey, striped on the sides with rose-colour, black and white.

The larva feeds on *Convolvulus*. Like many of the caterpillars of the *Sphingidae*, there are two very distinct varieties: one is bright green, with white spiracles, and a series of diagonal yellow lines above them; the other is dull yellowish-brown, with broad blackish-brown dorsal and ventral lines, and a series of triangular blackish spots above the spiracles, which in this variety are jet-black. In both these forms of larvae the anal horn is dark red tipped with black, and the skin is covered with numerous fine wrinkles. The length of the caterpillar when full grown is $3\frac{1}{2}$ inches.

About the middle or end of February these larvae generally bury themselves in the ground, where they are transformed into pupae. They remain in that condition until the following summer.

The pupa is about two inches in length and is of a dark mahogany-brown colour. It is furnished with a large curved process, projecting from the lower side of the head, and containing the enormous proboscis of the future moth.

The perfect insect appears in November and December. It flies with incredible velocity at evening dusk, and is often observed hovering over flowers, and whilst poised in the air above them, extracts the honey with its long proboscis.

This species occurs throughout Europe, Asia, Africa, Australia, the Pacific Islands and America, wherever a suitable situation is found, and has been met with far out at sea. It is thus practically cosmopolitan. There are slight geographical variations in specimens obtained from widely distant areas, but insufficient to warrant specific separation.

Mr. Howes reports that a specimen of the closely allied *Sphinx ligustri* was taken at Titahi Bay, near Wellington.*

* Naturalization of Plants and Animals in N.Z., 301.

Genus 2.—DEILEPHILA, Ochs.

Tongue strongly developed. Antennae less than $\frac{1}{2}$, gradually thickened to near apex, then pointed, apex slender, hooked. Abdomen smooth, broad, conical, pointed. Tibiae with appressed scales.

A large nearly cosmopolitan genus, chiefly in warm regions, represented in New Zealand by one very wide-ranging species.

DEILEPHILA CELERIO.

(*Chacrocampa celerio*, L., Syst. Nat. 1, 491; Huds. Trans. N.Z. Inst., xxxvii., 359.)

(Plate VI., fig. 15.)

This very handsome insect was first observed in Nelson by the late Mr. R. I. Kingsley, in December, 1903, and other specimens were secured by Messrs. Whitwell, Mules and Gibbs a few weeks later. In March, 1904, it was taken by Mr. Creagh O'Connor at Titahi Bay, on the northern shore of Cook Strait, and a specimen was bred from a larva found by the Rev. A. Doull at Otahuhu, near Auckland, in the same year. Another was taken at Te Tua, near Orepuki, Southland, in April, 1917,* and a further example captured by Mrs. F. Toogood, near the sea coast, between Featherston and Masterton, in February, 1925. The insect is therefore evidently very irregular in its appearance.

The expansion of the wings is about 3 inches. The forewings, which are very narrow, are deep brownish-ochreous, with short black and silvery longitudinal lines; there is a shining silvery streak, divided by two fine brownish lines, running from the base of the dorsum to the apex and a fine silvery streak parallel to the termen; a little below the middle of the costa there is a blackish dot in a pale spot. The hind-wings are rose-colour with the termen and a central band broadly black; the intermediate pale rosy band is also divided by black veins.

There appears to be considerable variation in size, and in the depth and intensity of the ground colour and markings. The larva, which feeds on the vine (*Vitis vinifera*), yellow bedstraw (*Galium verum*), fuchsia and virginia-creeper (*Ampelopsis*), is stated to be green or brown, with black eye-like markings on the fifth and sixth segments, with white pupils enclosed in slender yellow rings; the horn is slender, long and straight.*

The perfect insect appears from December till March, and should be looked for in cultivated districts. At present it seems to be only a casual visitor from Australia, but may, perhaps, ultimately become permanently established in New Zealand. In Britain it occurs very rarely south of the Caledonian Canal, and in the north of Ireland, but only as an occasional immigrant. It is a very widely distributed species, ranging through West, Central and Southern Europe, South Asia, Africa and Australia.

* Trans. N.Z. Inst., lli., 43.

* Kirby, European Butterflies and Moths, 72.

CHAPTER VIII.

THE ARCTIADAE.

This interesting family, which is principally distinguished by vein 8 of the hind-wings anastomosing with the upper margin of the cell from the base to near the middle (Plate C. figs. 1-5), includes many well-known and beautiful European species popularly known as "Tiger moths" and "Footmen." It is, however, very poorly represented in New Zealand by only six species, as against about thirty-one in Britain, forty in Europe, and upwards of one hundred and sixty-one in the Palaearctic Region. These six species belong to four genera.

1. METACRIAS. 2. CELAMA. 3. UTETHEISA.
4. NYCTOMERA.

Genus 1.—METACRIAS, Meyr.

Tongue obsolete. Antennae in male bipectinated to apex. Palpi short, hairy, concealed in long hairs of head. Thorax and femora densely hairy beneath. Anterior tibiae with apical claw, posterior tibiae without median spurs. Fore-wings with veins 7 and 8 out of 9, 10 sometimes connected with 9 above 7. Hind-wings with 3, 4 and 5 nearly approximated, 6 and 7 connate, or short stalked, 8 anastomosing to $\frac{1}{2}$ of cell. Wings in female rudimentary, or absent. (Plate C., figs. 1, 2 Neuration of *Metacrias erichrysa*.)

This interesting endemic genus is of doubtful affinity, but appears to be nearest to *Ocnogyna*, which is a genus of about a dozen species located round the shores of the Mediterranean; Hampson also assigns to it one species from Peru. It is represented in New Zealand by three species, and it is possible that others may yet be discovered in remote unexplored mountainous regions. So far as is yet known, these three species are confined to the South Island, but a hairy larva, presumably referable to this genus, has been found on the Tararua Range, in the North Island. An attempt to rear the perfect insect proved unsuccessful.

METACRIAS HUTTONI.

(*Phaos huttoni*, Butl., Cist. Ent., ii., 487; *Metacrias huttoni*, Meyr., Proc. Linn. Soc. N.S.W. 1886, 750; Trans. N.Z. Inst., xxii., 216; Hamps. Cat., iii., 468.)

(Plate VI., fig. 1 ♂.)

This interesting species, which was discovered by Captain Hutton, has occurred commonly on Mount Earnslaw, at the head of Lake Wakatipu, on the Remarkables, and on Vanguard Peak, near Macetown.

The expansion of the wings of the male is $1\frac{1}{2}$ inches. The fore-wings are black; there is an oblique crimson line near the base, two broad longitudinal cream-coloured lines above and

below the middle, and a double transverse series of oblong cream-coloured spots near the termen. The hind-wings are pale ochreous, with a black crescent-shaped spot near the middle, and a broad black band almost touching the termen except a little before the tornus. The female is apterous.

The larva, which feeds on mountain grasses, is about one inch in length; very hairy, the hairs on the terminal segments being the longest; its general colour is black; the shorter hairs are reddish-ochreous-brown, the longer and more numerous hairs black; there is a row of shining blue warts round each segment, except the second. It feeds fully exposed to view in the hottest sunshine, and when so engaged has a handsome iridescent appearance. It does not change into a pupa in the autumn, but evidently passes the winter as a hibernating larva.

The perfect insect appears from December till March. It is found on high grassy country between 4000 and 5000 feet above the sea-level. It flies with great rapidity in the hottest sunshine. The form occurring on the Remarkables is much larger, but otherwise identical.

METACRIAS ERICHRYSA.

(*Metacrias erichrysa*, Meyr., Proc. Linn. Soc. N.S.W., 1886, 749; Trans. N.Z. Inst. xxii., 216; Hamps., Cat., iii., 469.)

(Plate VI., fig. 12 ♂.)

This fine insect, which is the largest species of the genus at present known, was discovered by Mr. Meyrick on Mount Arthur, near Nelson, in January, 1886. Since that time a good many specimens have been secured by other collectors in the same locality, and in December, 1919, Mr. C. E. Clarke found this species commonly on McKinnon Pass, near Lake Te Anau.

The expansion of the wings is fully $1\frac{1}{2}$ inches. All the wings are orange yellow with black markings. The fore-wings have a broad longitudinal streak from base to middle of disc; an elongate spot on transverse vein; beyond this the veins are marked in black; there is a black subterminal line and terminal margin. The hind-wings have a large black discal spot; a broad, irregular terminal band and tornal spot.

There is considerable variation in the width of the black markings, especially on the fore-wings, which are sometimes much suffused with black. The female, which was bred by Mr. Meyrick, is stated to be wholly whitish-ochreous with the wings minute and aborted and the legs short, stout and well developed.

The larva is black clothed with long black hairs, those covering segmental divisions brownish-ochreous. It feeds on *Senecio bellidioides*.

The pupa is enclosed in a slight cocoon.

The perfect insect occurs in January, frequenting sunny, grassy slopes on the mountain-sides, at about 4,000 feet above the sea-level. It flies with great rapidity; hence it is generally very difficult to catch.

METACRIAS STRATEGICA.

(*Arctia strategica*, Huds., Entom., 1889, 53. *Metacrias strategica*, Meyr., Trans. N.Z. Inst. xxii. 216.)

(Plate VI., fig. 10 ♂, 9 ♀; Plate I., fig. 20 larva.)

This interesting species was discovered by Mr. W. W. Smith near the summit of the Richardson Range, in South Canterbury, at an elevation of about 3,000 feet above the sea-level. It has since been found abundantly by Messrs. Howes and Philpott at various localities in the Invercargill district, and on Flagstaff Hill, near Dunedin.

The expansion of the wings of the male is from 1½ to 1¾ inches. The fore-wings are black, with two broad, dull yellow, longitudinal streaks; between the costa and the first streak is a very fine yellowish line, and between the two streaks there are three similar lines. The hind-wings are bright yellow, with a broad black band, parallel to the termen, interrupted just before the tornus; the vicinity of this black band is tinged with crimson. The body is black; the top of the head, collar, and sides of the thorax and abdomen are dull yellow. The female has the wings rudimentary and is quite incapable of flight. The body is very stout, clothed with dense tufts of pale ochreous hair-like scales; the legs and antennae are short but well developed.

Male specimens from the Invercargill district are somewhat smaller than the original type specimen, and in many of them the crimson shading on the hind-wings is absent. The fine yellowish lines on the fore-wings are occasionally but faintly indicated, or obsolete. The specimen figured in this work was taken at Invercargill, whilst former figures were made from the type specimen.

According to Mr. Howes* the larvae, which feed on grasses, are of two distinct varieties; one glossy black, merging into rich brown beneath; the other a deep glossy brown above, becoming light brown beneath. These larvae are stated to resemble those of *Nyctemera annulata*, but the hairs are longer and are arranged in denser tufts; there are also several long grey hairs projecting from the posterior extremity. The full grown larvae of *Metacrias strategica* is about 1½ inches in length. When alarmed it invariably rolls itself into a ball, remaining in that position for a considerable time. The pupa is enclosed in a slight oval cocoon composed of silk and the larval hairs. It is usually attached to the under-surface of a log. The male pupa is more elongate than the female.

The perfect insect appears from November till February, and seems to frequent grassy places on the outskirts of forest. The flight of the male is described as very swift, about seven feet from the ground, and much resembling that of a humble-bee (*Bombus*). The female is extremely sluggish, walking very slowly, and with considerable difficulty. From observations made by Messrs. Howes and Philpott, it appears evident that this species passes the winter months as a hibernating larva.

Genus 2.—CELAMA, Walk.

Proboscis well developed; palpi porrect, extending about the length of head; the 2nd joint roughly scaled above and below, the 3rd moderate, slightly scaled; maxillary palpi minute; frons with tuft of scales; antennae with tuft of scales on basal joint; tibiae with spurs well developed. Fore-wing triangular; vein 3 from before angle of cell; 5 from above angle, 6 from below upper angle; 7 and 8 stalked; 9, 10 absent; 11 oblique. Hind-wing with vein 3 from angle of cell; 4 absent; 5 from middle of discocellulars or well above angle; 6, 7 stalked, rarely from cell; 8 from middle of cell.

An Australian genus, of which only one species is known in New Zealand at present.

CELAMA PARVITIS.

(*Adeixis parvitis*, Howes, Trans. N.Z. Inst., xlix., 274.)

(Plate XLIV, fig. 7 ♀.)

This interesting little species was discovered by Mr. C. E. Clarke at Broad Bay, Otago Peninsular. It has also occurred at Nelson and at Lake Wakatipu.

The expansion of the wings is ¾ inch. The fore-wings are triangular with the termen obliquely rounded; very pale whitish-grey; there is a slightly-curved oblique brownish-black bar across the middle of the disc and a dark grey shading around the apex and along the termen; a few scattered yellowish scales are situated on the discal bar. The hind-wings and cilia are greyish-white.

The perfect insect appears in December.

Described and figured from a specimen in Mr. Clarke's collection.

We are indebted to Mr. Philpott for assigning this insect to its correct position. (See Trans. N.Z. Inst., lvii., 703.)

Genus 3.—UTETHEISA, Hübn.

Head smooth. Tongue developed. Antennae in male ciliated, with longer setae at joints. Palpi moderate, ascending, with loosely appressed scales. Thorax smooth beneath. Posterior tibiae with all spurs very short. Fore-wings with veins 7 and 8 out of 9, 10 connected with 9. Hind-wings with veins 3, 4, 5 rather approximated, 6 and 7 connate or short-stalked, 8 anastomosing to middle of cell.

A small cosmopolitan genus represented in New Zealand by a single species of wide distribution.

UTETHEISA PULCHELLA.

(*Deiopcia pulchella*, L., Meyr., Trans. N.Z. Inst., xxii., 217.)

(Plate VI., fig. 18 ♀.)

Stray specimens of this very familiar European species have occurred at Auckland, Thames, Wainui-omata, Petone and Titahi Bay in the Wellington district, as well as in Nelson, at Dunedin and Waitaki, but the records at present available indicate that its appearance in New Zealand is very exceptional.

The expansion of the wings is about 1½ inches. The fore-wings are white, with five irregular transverse rows of oblong crimson spots, alternating with six irregular rows of small black dots. The hind-wings are white, irregularly clouded with black on the termen; there are two small black spots near the middle. The body is white; the head and thorax are spotted with crimson, and the antennae are black.

* Trans. N.Z. Inst. xxxiii., 166.

The larva, which has not been observed in this country, is greyish with black warts from which arise tufts of hairs, blackish on the back, and pale greyish on the sides; there is a white line on the back and one on the sides. Each segment is often barred with orange. The head is reddish-ochreous, marked with black. It feeds on forget-me-not (*Myosotis*). The pupa is reddish-brown, enclosed in a white silken cocoon spun up among the food-plant, or on the surface of the ground; in the latter case particles of earth adhere to the outside.*

The perfect insect appears in February. So far as New Zealand is concerned it is evidently only an occasional immigrant. Although a feeble-looking insect it possesses extraordinary capabilities of flight, and is sometimes met with far out at sea. It occurs throughout Europe, Asia, Africa, Australia, and the Pacific Islands.

Genus 4.—NYCTEMERA, Hübn.

Head smooth. Tongue well developed. Antennae in male bipectinated throughout. Palpi moderately long, sub-ascending, with appressed scales; terminal joint moderate, cylindrical. Forewings with veins 7 and 8 out of 9, 10 connected with 9 by a bar. Hind-wings with veins 6 and 7 sometimes stalked, 8 closely appressed to cell towards base, connected by bars at each end of appressed portion.† (Plate C, figs. 4, 5 Neuration of *Nyctemera annulata*, fig. 3, head of ditto.)

An Indo-Malayan genus of some extent, spreading into Australia and Africa; the single New Zealand species is endemic, but approaches Australian forms.

NYCTEMERA ANNULATA.

(*Leptosoma annulata*, Boisd., Voy. Astr. v. 197, pl. v. 9; Dblid., Dieff. N.Z. ii. 284. *Nyctemera doubledayi*, Walk., Bomb. 392. *Nyctemera annulata*, Meyr., Proc. Linn. Soc., N.S.W., 1886, 760; Trans. N.Z. Inst. xxii. 218.)

(Plate VI., fig. 3 ♂; Frontispiece, fig. 4 egg.)

This species is perhaps one of the best known of the New Zealand Lepidoptera, occurring in great profusion in all parts of both North and South Islands. It is also common at Stewart Island, in the neighbourhood of cultivation; and has been found in the Chatham Islands.

The expansion of the wings is about 1½ inches. All the wings are deep sooty black. The fore-wings have an irregular cream-coloured band running from beyond the middle of the costa towards the torus. This band is interrupted in the middle, and crossed by several black veins, which sometimes almost break it up into a chain of spots. The hind-wings have a single large cream-coloured spot near the middle. The body is black, with several orange markings on the thorax, and a series of broad orange rings on the abdomen.

This species varies a good deal in the extent of the cream-coloured markings.

The egg is semi-globose, deep ochreous, very highly polished, and covered with extremely minute depressions.

The larva feeds on *Erechtites prenanthoides*, but in cultivated districts it is more often observed on *Senecio mikanioides*, a plant having a superficial resemblance to ivy, which frequently grows in great profusion on fences and hedgerows in various parts of the country. It also feeds on the common groundsel (*Senecio vulgaris*) ragwort, (*S. jacobaea*), rangiora, (*Brachyglottis repanda*), and *Cineraria maritima*. These caterpillars may often be observed on mild days in the middle of winter, and full grown specimens are very common towards the end of August, so it is quite clear that the insect passes the winter in the larval condition. At other seasons there is a continuous succession of broods.

The length of the caterpillar when full grown is 1½ inches. It is covered with numerous tufts of long black hair, and is black in colour, with the dorsal and lateral lines dark-red. There are several large blue spots round the middle of each of the segments, and the membrane between each segment is bluish-grey. In younger larvae the bluish-grey colouring extends over a considerable portion of the insect.

This caterpillar may be readily found, as it feeds on the upper surface of the leaves fully exposed to view. It is evidently unpalatable to birds, and hence the secret habits we observe in most larvae are absent in this species.

When full-fed it selects a secluded spot, generally a crevice in the trunk of a tree, where it spins an oval cocoon of silk intermixed with its own hairs. Here it changes into a shining black pupa, speckled and striped with yellow. The insect remains in this state about six weeks.

The moth first regularly appears in September, and continues abundant until April, occasional stragglers being met with during the entire year. It is extremely common, especially during the latter end of the summer, when specimens may often be seen flying in all directions. It has a remarkable habit of soaring in the early morning sunshine, soon after sunrise in calm fine weather, and large numbers may frequently be seen thus engaged. This is a very unusual habit, as most day-flying Lepidoptera are not astir before 7 or 8 a.m.

There is every reason to think that the vivid yellow and black markings of the present insect are true warning colours, indicating to any possible enemy its unpalatable nature. This is corroborated by the fact that, although so easily seen, the moth is not attacked by birds. Its slow flight, combined with the lack of any instinctive attempt at concealment, also shows that it is probably specially protected by a nauseous flavour. Owing to its diurnal habits and bright colouring, this familiar insect is often mistaken for a butterfly by the uninitiated.

This species also occurs in the Kermadec Islands.

* South, "Moths of the British Islands," 1, 170.

† On account of the peculiar structure of vein 8 of the hind-wings this genus is generally placed in the small tropical family Hyppsiidae.

CHAPTER IX.

THE NOCTUIDAE.

The *Noctuidae* are distinguished by the following characters:—

Ocelli usually present. Tongue usually well developed. Labial palpi moderate, more or less ascending, second joint densely scaled, usually rough, terminal rather short, obtuse. Thorax usually densely hairy beneath. Posterior tibiae with all spurs present. Fore-wings with veins 7 and 8 usually out of 9, 10 usually connected with 9. Hind-wings with veins 3 and 4 connate or short-stalked, 5 obsolete or imperfect, parallel to 4 (except in the *Hypenides* and *Plusiades*), 6 and 7 connate or short-stalked or seldom closely approximated only, 8 shortly anastomosing with cell near base, thence evenly diverging. Plate C., figs. 6-12 and 14-18.) Imago with fore-wings usually elongate, body relatively stout, and densely scaled. It may be noted as an established conclusion that antennal pectinations, if not extending to the apex of the antennae, are in this family seldom sufficient to mark generic distinction.

Ovum spherical, more or less distinctly ribbed, and reticulated. Larva usually with few hairs, often nocturnal, sometimes subterranean; often very polyphagous. Pupa usually subterranean.

This very extensive family of dull coloured night-flying moths is abundant in all regions, the sub-families *Hypenides*, *Catocalides* and *Plusiades* being especially characteristic of the tropics. The structure is generally speaking remarkably uniform, and the markings on the fore-wings very similar, consisting of the basal, first, second and sub-terminal transverse lines and the reniform, orbicular and claviform stigmata, the latter being specially characteristic of the family. The hind-wings are usually destitute of distinct markings, though very generally much darker on the terminal area. The dull colouring exhibited by most members of the family is protective, being specially adapted for purposes of concealment amongst dead leaves and refuse.

Probably owing to their large size these insects have, up to the present, received more attention from New Zealand entomologists than any other group, but it is nevertheless true that they are the least attractive and most difficult of the Lepidoptera to study. As already stated, almost all the *Noctuidae* are strictly nocturnal in their habits and few can be obtained in the day-time. They may, however, be freely collected by night at blossoms, or sugar, and some species are occasionally attracted by light.

The family is represented in New Zealand by thirty genera belonging to seven sub-families.

- | | |
|----------------------------|---|
| Sub-family 1.—AGROTIDES | { 1. HELIOTHIS
2. EUNOA
3. AGROTIS
4. GRAPHIPHORA |
| Sub-family 2.—POLIADES | { 5. AUSTRAMATHES
6. ANDESIA
7. HOMOHADENA |
| Sub-family 3.—MELANCHRIDES | { 8. ICHNEUTICA
9. LEUCANIA
10. ALETIA
11. PHYSETICA
12. DIPAUTICA
13. PERSECTANIA
14. ERANA
15. MELANCHRA |
| Sub-family 4.—CARADRINIDES | { 16. BITYLA
17. ARIATHISA
18. SPODOPTERA
19. COSMODES |
| Sub-family 5.—HYPENIDES | { 20. HYPENODES
21. CATADA |
| Sub-family 6.—CATOCALIDES | { 22. OPHIUSA
23. MOCIS |
| Sub-family 7.—PLUSIADES | { 24. PLUSIA
25. OPHIDERES
26. DASYPODIA
27. SERICEA
28. RHAPSA
29. ANOMIS
30. COSMOPHILA. |

Sub-family 1.—AGROTIDES.

Eyes glabrous; tibiae spinose.

Genus 1.—HELIOTHIS, Och.

Face with rounded prominence. Antennae in male ciliated. Thorax and abdomen without crest. Anterior tibiae with apical inner and outer claws.

A rather small cosmopolitan genus of which some species range very widely; one of these has reached New Zealand.

HELIOTHIS ARMIGERA.

(*Heliothis armigera*, Hübn., Samml. Eur. Schmett., 370; Meyr., Trans. N.Z. Inst., xix. 34; *Heliothis conferta*, Walk. Cat., ix., 690.)

(Plate VI., fig. 26 ♀; Plate I., figs. 15, 16 larvae.)

This cosmopolitan species appears to be generally distributed throughout New Zealand. Some forty years ago

it was quite a common insect in the neighbourhood of Wellington, but it is now rarely met with, and its numbers seem to be declining in most localities.

The expansion of the wings is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. The fore-wings are pale yellowish-brown, sometimes tinged with red. There is an irregular band of dull grey or brown near the termen; the reniform is small and blackish; the orbicular minute, also blackish; the claviform is obsolete; there are several very indistinct traces of transverse lines towards the base of the wing. The hind-wings are dull yellow, with a very broad, blackish, terminal band. The head and thorax are yellowish-brown, and the abdomen is dull yellow.

This insect varies a good deal in the ground colouring of the fore-wings, which ranges from dull yellow to brick-red, or even to dark yellowish-brown. The hind-wings are also much darker in some specimens than in others.

The larva feeds on the seeds and flowers of various plants. It is extremely variable in its colouring.

Some specimens are dull green, with a few obscure red spots on the sides of the anterior segments. Others are brownish-black, with many fine yellow stripes and dots, and the red spots confined to the three anterior segments. Others, again, have numerous olive-green, white, and pale green lines, with a reddish blotch on the side of nearly every segment.

This caterpillar is often rather destructive in gardens. Amongst other things, it devours tomatoes and peas, the flowers and young fruit of pumpkins and vegetable marrows, the flowers and leaves of geraniums, veronias, etc. It is full grown in the autumn.

The pupa is concealed in the earth, the insect remaining in this condition until the following summer.

The moth appears in January and February. It often flies by day, and may then be seen disporting itself amongst the flowers of the Scotch thistle. Its larva may also be found feeding on these flowers.

This insect is practically cosmopolitan; it has occurred in the following countries: Australia, Samoa, India, Ceylon, Madagascar, Africa, Europe, North and South America.

Genus 2.—EUXOA, Hübn.

Face with small truncate-conical prominence with raised rim. Antennae in male bipectinated, towards apex simple. Thorax with rather spreading anterior and posterior crests. Abdomen without crests.

An extensive cosmopolitan genus represented in New Zealand by three species.

EUXOA RADIANS.

(*Euxoa radians*, Guen., Noct., i., 261; *munda*, Walk., Cat., x., 348; *basinotata*, ib., xv., 1686; *turbulenta*, ib., xxxii., 703; *injuneta*, ib., xxxii., 703; *scapularis*, Feld., Rels., Nov. pl. 110, 13.)

(Plate VI., fig. 25 ♂.)

This pretty species has occurred at Rotorua, Ohakune, Tararua Ranges, and Wellington, in the North Island, and at Dunedin, Alexandra and Invercargill, in the South Island, but seems to be rarely met with.

The fore-wings are pale brownish-grey, darker towards the termen; the markings are dark brown and very conspicuous;

the claviform is very elongate; the orbicular small, irregularly oval, edged first with white, then with dark brown; the reniform large, edged with dark brown; there is a brown streak which partially envelopes the orbicular and reniform; the first and second lines are indicated on the costa by whitish bars, otherwise indistinct; there is a series of confluent terminal dots. The hind-wings are pearly-white, slightly iridescent; there is a brown apical shading and the veins and termen are finely and clearly marked in brown. The antennae of the male are shortly bipectinated from the base to about $\frac{2}{3}$, thence simple to apex.

The perfect insect appears from October till February, and has been taken at blossoms. It is common in Australia, and is also found in the Friendly Islands and at Norfolk Island.

EUXOA ADMIRATIONIS.

(*Agrotis admirationis*, Guen., Ent. Mo. Mag., v., 38; *Cherisotis sericea*, Butl., Cist. Ent. ii., 490; *Agrotis inconspicua*, Butl., Cist. Ent., ii., 545; *Agrotis veda*, Howes, Trans. N.Z. Inst., xxxviii. 511.)

(Plate VI., fig. 7 ♂.)

Although nowhere common this species appears to be generally distributed throughout both North and South Islands.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings vary from very pale grey to pale reddish-grey; there is an obscure transverse line near the base, and another at about one-fourth; the orbicular is oval and dark centred, the claviform is elongate, often very obscure, the reniform is broad, dark centred, usually joined to the orbicular by a dark patch; all the stigmata are outlined in black; beyond the reniform there is a rather jagged transverse line, and several faint wedge-shaped markings; there is a series of minute elongate black marks on the termen; the cilia are grey with three dark lines. The hind-wings are grey with a series of fine black marks on the termen; the cilia are white.

This species is very variable, both in the depth of the ground colour and in markings.

The perfect insect appears from October till March. It is usually taken at sugar.

EUXOA CEROPACHOIDES.

(*Agrotis ceropachoides*, Gn., Ent. Mo. Mag. v. 39; Meyr., Trans. N.Z. Inst. xix. 34.)

(Plate VII., fig. 4 ♂.)

This species has occurred at Nelson, and at Rakaia and Porter's Pass, in Canterbury.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are bluish-grey, dotted and streaked with darker grey; there are no distinct markings, except that the first and second lines are obscurely paler than the rest of the wing and there is a series of blackish terminal dots; the costa is slightly concave. The hind-wings are grey, paler towards the base, with a dark line on the termen; the cilia of all the wings are grey.

The perfect insect has been taken in February, July, August and September.

Described and figured from a specimen in the Fereday collection.

Genus 3.—AGROTIS, Ochs.

Face without prominence. Antennae in male bipectinated, towards apex simple. Thorax with anterior and posterior crests.

Abdomen without crests. Anterior tibiae short, thickened, not longer than first joint of tarsi.

Of his rather limited, but generally distributed genus, we have three species in New Zealand.

AGROTIS YPSILON.

(*Noctua ypsilon*, Rott., Naturf., ix. 141; *Agrotis suffusa*, Hb., Samml. Eur. Schm., 134; *Agrotis ypsilon*, Meyr., Trans. N.Z. Inst. xix. 32.)

(Plate VI., fig. 21 ♀.)

This handsome insect is common throughout the country, and it has occurred in the Chatham Islands.

The expansion of the wings is 2 inches. The fore-wings are pale brown, shaded with rich brown on the costa and termen; the reniform is large and black, with a conspicuous longitudinal streak pointing towards the termen; the orbicular is round, centred with black; the claviform is elongate; there is a dark shaded line below the reniform, followed by a double wavy transverse black line. The hind-wings are grey with pinkish reflections; they are shaded with darker grey towards the termen; the cilia are white, the head and thorax are dark brown, the abdomen grey. In the female the brown costal shading extends across the central portions of the fore-wings to the dorsum, and the general colouring is also darker.

Some specimens have the entire ground colour of the fore-wings blackish-grey but otherwise there are no important variations.

The larva, which feeds on the roots of many plants, is about two inches in length, cylindrical, flattened anteriorly, with very small blackish-brown head; the thoracic segments are considerably wrinkled, the second segment with a horny black dorsal plate, the third and fourth segments with a row of horny warts; dull lead colour, much paler and tinged with ochreous beneath; there are very obscure, darker, lateral and dorsal lines; each remaining segment has four conspicuous black warts, each wart emitting a short bristle.

The pupa is red-brown with a very sharp, spine-like extremity. It is concealed in the earth.

The perfect insect appears from October till April. It is often very abundant at blossoms in the evening, and comes readily to sugar. It is an insect of almost universal distribution, occurring in Australia, China, India, Africa, Europe, and North and South America.

AGROTIS SPINA.

(*Agrotis spina*, Gn., Noct., i. 269; Philp., Trans. N.Z. Inst., lii. 42.)

(Plate XLVIII., fig. 35 ♂.)

This Australian form has occurred at Invercargill and probably elsewhere in New Zealand.

The expansion of the wings is nearly 2 inches. The fore-wings of the male are rather bright yellowish-brown, clouded with deep purplish-brown on the terminal area; the markings almost exactly resemble those of *A. ypsilon* except that the black bar between the orbicular and reniform and the black dash beyond the reniform are much more conspicuous and the subterminal line is only slightly irregular instead of dentate. The hind-wings are grey-whitish, clouded with blackish along the termen.

In the female the distinctions between *Agrotis ypsilon* and the present insect are much less evident, and hence in this sex the two species are very difficult to separate.

The perfect insect appears in February, and was taken at sugar in open cultivated country.

Described and figured from a specimen kindly lent me by Mr. Philpott.

AGROTIS INNOMINATA.

(*Agrotis innominata*, Huds., N.Z. Moths, 31; *Agrotis admirationis*, Meyr., (nec. Guenée) Trans. N.Z. Inst., xix. 33.)

(Plate VI., fig. 20 ♂.)

This rather distinctly-marked species has been taken on the sea-coast near Wanganui, Wellington and Dunedin.

The expansion of the wings is 1½ inches. The fore-wings are pale pinkish-brown, sometimes slightly tinged with green; there is a slender black longitudinal streak on the costa at the base, a broad black longitudinal streak at the base near the middle, and another a little beyond the base above the middle, containing the orbicular and reniform stigmata, these are sharply outlined in pale ochreous; there are several indistinct blackish marks between the veins, and a series of terminal black dots; the cilia are dull pinkish-brown. The hind-wings are dull white; there is a series of brownish terminal dots, and the veins are marked in brown; the cilia are shining white. The head and thorax are pinkish-brown; the latter has two transverse black lines near the head, and two longitudinal black streaks on each side. The abdomen is dull white, tipped with pale brown.

The perfect insect appears from September till December. It is not a common species.

Genus 4.—GRAPHIPHORA, Ochs.

Face without prominence. Antennae in male ciliated. Thorax with anterior and posterior crests. Abdomen without crests. Anterior tibiae moderate, longer than first joint of tarsi.

A large genus of universal distribution represented in New Zealand by one species.

GRAPHIPHORA COMPTA.

Graphiphora compta, Walk., Cat., x. 404; *Taeniocampa immunis*, ib. x. 430; *quadrata*, Walk., Cat., xi. 745; *Cerastis innocua*, ib. xv. 1710; *reciproca*, ib. xxxii. 672; *Noctua breviuscula*, ib. xxxiii. 716; *communicata*, ib. xxxiii. 716; *Agrotis accitina*, Feld. Reis. Nov., pl. cix. 6. *Orthosia immunis*, Meyr., Trans. N.Z. Inst., xix. 30.)

(Plate VII., figs. 1 and 2 ♂ varieties.)

This bright-looking species has occurred in the North Island at Kaeo, Auckland, Ohakune and at Wellington. In the South Island it has been found at Blenheim, Christchurch, Tuatapere, and Invercargill.

The expansion of the wings is 1½ inches. The fore-wings vary from bright orange-brown to dull reddish-brown; there is an obscure black dot near the base, a faint transverse line at about one-fourth; the orbicular is oval, faintly outlined in brown; the claviform is very faint, its position indicated by a small brown dot; the reniform is large, oblong, much indented towards the termen, doubly outlined with dull yellow and containing a blackish spot towards its lower edge, its posterior margin is shaded with dark brown; there are several faint, wavy, transverse lines near the termen, and the termen itself is shaded with brownish-black; the cilia are reddish-brown. The hind-wings are dull grey; the cilia are pale reddish-ochreous tipped with white. The head is covered with scattered white scales, the

thorax is reddish-brown, and the abdomen is grey tipped with reddish-brown; the upper joints of the tarsi of the anterior legs are white.

There are two rather distinct forms of this species, one being considerably darker than the other. The fore-wings of the paler form are orange-brown, of the darker form reddish-brown. I have not yet found any intermediate varieties which connect these two forms, but the differences between them do not appear sufficient to warrant their specific separation.

The larva feeds on nettle (*Urtica*).

The perfect insect appears in January, February, and March. It frequents the blossoms of the white rata, where it occasionally may be taken in the daytime, but more frequently at night.

This species is common in Australia, and reaches the New Hebrides.

Sub-family 2.—POLIADES.

Eyes glabrous but overhung by long cilia from margins; tibiae not spinose.

Genus 5.—AUSTRAMATHES, Hamps.

Face without prominence. Terminal joint of palpi rather long. Antennae in male ciliated. Thorax with divided anterior and spreading posterior crests. Abdomen without crests.

An endemic genus of somewhat doubtful affinity, it is not very distinct, but the palpi are rather characteristic. We have one species in New Zealand.

AUSTRAMATHES PURPUREA.

(*Graphiphora purpurea*, Butl., Cist. Ent., ii. 490; *Xanthia ceramodes*, Meyr., Trans. N.Z. Inst., xix. 31; *X. purpurea*, lb., xx. 46.)

(Plate VII., fig. 3 ♀; Plate I., fig. 26 larva.)

This handsome species has been found at Wellington in the North Island, and at Dunedin in the South Island.

The expansion of the wings is 1½ inches. The fore-wings are very deep, rich, glossy reddish-brown with several scattered whitish scales; there is a distinct yellow mark on the costa at about one-fourth, forming the beginning of a broken transverse line; the orbicular is small, round, and yellowish; the reniform is small, crescentic and yellowish, the space between the orbicular and the reniform is very dark blackish-brown; beyond the reniform there is a conspicuous white mark on the costa forming the beginning of a second broken transverse line; a third shaded line is situated near the termen. The hind-wings are pale brown with a dark spot in the middle, very conspicuous on the under surface.

The full-grown larva is about 1¼ inches long, moderately stout and of uniform thickness. The head is ochreous, with a black stripe on each side; the back of the larva is dark greyish-green, and the under surface pale greenish-ochreous; there is a rather large, shining, black mark above each spiracle; the dorsal, sub-dorsal and lateral lines are orange-yellow and very conspicuous, the two upper lines being very much broken; there are several minute black warts below the spiracles, and a series of

very small black marks on the orange dorsal line. It feeds during the spring and early summer on *Meliclytus rami-florus*. When full-grown it constructs a strong cocoon of moss and silk on the surface of the ground, remaining therein for some weeks before it is transformed into a pupa.

The perfect insect appears in March and April, hibernated specimens being sometimes met with in August and September, or even in the depth of winter. It is usually taken at sugar or at light, but is not a common species.

Genus 6.—ANDESIA, Hamps.

Face without prominence. Antennae in male ciliated. Thorax with anterior angles ridged and projecting and with anterior and posterior crests. Abdomen with crest on basal segment.

This genus is represented in New Zealand by one species, which bears considerable superficial resemblance to *A. oenistis* recorded by Hampson from Argentina, a most interesting identification.

ANDESIA PESSOTA.

(*Miscia pessota*, Meyr., Trans. N.Z. Inst. xix. 29.)

(Plate VI., fig. 17 ♂.)

This little species has occurred at Wanganui and Wellington in the North Island, and at Lake Coleridge, Rakaia, and Lake Wakatipu in the South Island.

The expansion of the wings is 1 inch. The fore-wings are dull purplish-brown; there is an oblong black mark at the base of the dorsum containing a slender curved white line; the orbicular is rather small, round, margined first with dull white and then with black; the reniform is large, oblong, dull white, margined with pale ochreous towards the base of the wing; there is a conspicuous oblong black mark between the orbicular and reniform stigmata. The hind-wings are dull grey, with the cilia paler.

The perfect insect appears in January, and is usually taken at sugar. It is a rare species.

Genus 7.—HOMOHADENA, Grote.

Face without prominence. Antennae in male ciliated. Thorax without crests. Abdomen without crest.

There is only one New Zealand species.

HOMOHADENA FORTIS.

(*Orthosia fortis*, Butl. Cist. Ent. ii. 549; *Miscia iota*, Huds., Trans. N.Z. Inst., xxxv. 243, pl. xxx. 3.)

(Plate VI., fig. 11 ♂.)

This very distinctly-marked little insect has occurred in the North Island at Wellington. In the South Island it has been found in the Marlborough province, at Lake Wakatipu and Invercargill.

The expansion of the wings is a little over 1 inch. The fore-wings are dull brownish-ochreous finely speckled with black; there is a conspicuous hook-shaped black mark close to the base, a sharp black mark on the costa at about ¼, a clouded wavy line near the middle of the wing, darker on the costa, a sharp

black mark on the costa just beyond this, followed by a wavy band of dark brownish-black, very much broader on the costa than on the dorsum, and bordered with a pale wavy line towards the termen. The hind-wings are dark brownish-black. The cilia of the fore-wings are brownish-ochreous, of the hind-wings dark-grey. The head and thorax are brownish-ochreous, and the abdomen grey. There are two conspicuous black marks on the anterior portion of the thorax.

The perfect insect may be found from August till April. It is apparently a very rare species in most places, although common at Titahi Bay, near Wellington, and at Lake Wakatipu.

Sub-family 3.—MELANCHRIDES.

Eyes hairy; tibiae not spinose.

Genus 8.—ICHNEUTICA, Meyr.

Face without prominence. Antennae in male strongly bipectinated to apex. Thorax clothed with hair without crests. Abdomen without crest.

An endemic genus represented by seven species, of which only one occurs in the North Island.

ICHNEUTICA DIONE.

(*Ichneutica dione*, Huds., N.Z. Moths, 14.)

(Plate VI., fig. 22 ♂.)

This interesting species was discovered by Mr. C. W. Palmer, on Mount Arthur, Nelson, at an elevation of about 4,400 feet. It has also been found at Waiho Gorge and on Mount Cleughearn, Hunter Mountains, Southland.

The expansion of the wings is 1½ inches. The fore-wings are dull blackish-brown, darker near the middle; there is a rather oblique, white, longitudinal stripe below the middle from about one-eighth to one-third; above this there is a very conspicuous, large, elongate white mark; this mark has a semicircular indentation above, probably representing the orbicular; another indentation towards the termen, probably representing the reniform, and below this it emits two short teeth-like projections; beyond these markings the ground colour becomes paler, and is traversed by an obscure, jagged, transverse line; the cilia are grey. The hind-wings are pale grey; the cilia are also grey. The body is dark brownish-black. The pectinations of the antennae are slightly shorter than in *Ichneutica ceraunias*.

This species varies in the ground colour, which is sometimes clouded with reddish-brown; the whitish discal marking is also variable, and is sometimes divided.

The perfect insect appears in January, but is evidently very rare. It frequents open, grassy country between about 3,500 and 4,500 feet above the sea-level. Mr. Philpott informs me that it is very partial to the flowers of *Dracophyllum longifolium*. Like *I. ceraunias*, it will readily take wing during the daytime.

ICHNEUTICA CERAUNIAS.

(*Ichneutica ceraunias*, Meyr., Trans. N.Z. Inst. xix. 13.)

(Plate VI., fig. 5 ♂; 6 ♀; 4 dark variety of ♂.)

This very handsome species was discovered by Mr. Meyrick on the Tableland of Mount Arthur, where it seems to be fairly common. It has also occurred on Mount

Egmont, Mount Ruapehu and on the Tararua Range, in the North Island, and at Mount Grey, Arthur's Pass, Mace-town, Tutuau, Waipori, Hunter Mountains, and on the Lake Harris Saddle, near Lake Wakatipu, in the South Island.

The expansion of the wings of the male is 1½ inches, of the female 2 inches. The fore-wings of the male are rich orange-brown, paler towards the base. There are two very broad, longitudinal, yellowish stripes, one on the costa and the other on the dorsum. The costal stripe divides into two branches before its termination, one of which is produced downwards; there is also a conspicuous white mark a little beyond the middle of the wing emitting two tooth-like projections towards the termen, and two narrow, dark brown streaks near the base of the wing. The hind-wings are dark brownish-grey. The head, thorax, and abdomen are yellowish-brown, and the antennae are very strongly bipectinated. The female has much narrower wings, the ground colouring is pale brown, the markings are dull yellow and the hind-wings pale ochreous.

This species varies considerably in the intensity of the markings, and in the depth of the ground colour which, in southern specimens, is much clouded with dark brown, especially in the vicinity of the longitudinal streaks.

The perfect insect appears in December and January, frequenting high open country at an altitude of about 3,500 feet above the sea-level. It is sometimes seen flying wildly in hot sunshine, but is more often attracted by light.

ICHNEUTICA LINDSAYI.

(*Ichneutica lindsayi*, Philp., Trans. N.Z. Inst., lvi. 387.)

(Plate VI., fig. 8 ♂.)

This very handsome insect was discovered by Mr. S. Lindsay, on the slopes of the Hunter Mountains, towards Lake Manapouri, at an elevation of 4,000 feet above sea-level.

The expansion of the wings of the male is almost 1½ inches. The fore-wings are dark brown; there is an elongate trapezoidal patch of pale ochreous on the costa from the base to about ¾, considerably broader towards apex, its apical termination being inwards curved; a very much smaller elliptical patch is situated in the disc below this; the extreme basal portion of the wing is blackish, and the veins, except on the ochreous patch, are clearly marked in black. The hind-wings are greyish-ochreous, darker towards termen. The head and thorax are clothed with shaggy reddish-brown hair. The abdomen is blackish-brown, slightly tinged with purple.

The perfect insect appears in January, and may be looked for amongst the mountains in the extreme south.

Described and figured from specimen submitted by Mr. Philpott.

ICHNEUTICA CANA.

(*Ichneutica cana*, Howes, Trans. N.Z. Inst., xlv. 96.)

(Plate IX., fig. 15 ♂.)

This fine insect was discovered by Mr. Howes on the Garvie Mountains, near Lake Wakatipu, at an altitude of about 2,000 feet above the sea level.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are whitish-ochreous very densely speckled with grey, the pale ground colour remaining visible on the transverse lines stigmata and terminal area; the first line is strongly wavy; the claviform stigma indicated by a blackish mark; the orbicular is round, indistinct; the reniform ear-shaped, also rather faint; the space between the stigmata and the whole of the central area between the first and second lines is much clouded with dark greyish-black; the second line is strongly dentate; there is a series of blackish bars on the terminal area; the cilia are ochreous, irregularly barred with grey. The hind-wings are pale greyish-ochreous, with darker grey central and terminal bands.

The perfect insect appears in November, and frequents open tussock covered country. It flies freely in hot sunshine.

Described and figured from the type specimen kindly lent to me by Mr. Howes.

ICHNEUTICA LATA.

(*Aletia lata*, Philp., Trans. N.Z. Inst., xlvii. 192.)

(Plate VI., fig. 23 ♂; 24 ♀.)

This large and rather conspicuous species was discovered by Mr. H. Hamilton on Vanguard Peak, near Mace town. It has also occurred on Mount Peel, near Nelson, and on Bold Peak, at the head of Lake Wakatipu, at elevations of about 4,000 feet above the sea-level.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches; of the female $1\frac{1}{2}$ inches. The antennae of the male are dull orange-brown heavily bipectinated from base to apex. The fore-wings are dull greyish-green thickly speckled with blackish and ochreous scales, the central area being darker; the basal and first lines are broad, wavy, dull white, edged with blackish; the orbicular is rather small round white with a dusky central dot; the claviform very distinct also whitish; the reniform irregularly oblong, dull white with a dusky central line; the second line is very conspicuous, deeply indented between the veins white edged with blackish; there is a subterminal series of cloudy black spots, followed by a cloudy ochreous band; the cilia are dull greenish-grey barred with blackish. The hind-wings are dull greyish-brown with a cloudy discal lunule; the cilia are also greyish-brown with obscure darker bars. The female is pale grey with the lines and central band blackish-grey and much less distinct than in the male, the orbicular and claviform stigmata being hardly perceptible.

The perfect insect appears in December and January. It is evidently very rare, and confined to mountainous districts.

Described and figured from the type specimens in the Dominion Museum.

ICHNEUTICA MARMORATA.

(*Persectania marmorata*, Huds., Ent. Mo. Mag. lix. 7; *Ichneutica dives*, Philp., Trans. N.Z. Inst., lv. 207.)

(Plate L., fig. 10 ♂, 17 ♀.)

This handsome species was discovered by Mr. Philpott on the Mount Arthur Tableland, at an elevation of about 4,500 feet above the sea-level.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings of the male are slaty grey strongly but somewhat irregularly tinged with dull red; the markings are black, edged with grey;

the basal line is distinct, interrupted, reaching about half across the wing; the first line strongly wavy, bowed outwards in the middle, the minute claviform being in contact at that point; the orbicular is very minute round; the reniform large, ear-shaped, dull ochreous, darker in the middle; the second line is strongly dentate with a complex deep dentation above tornus; the subterminal line is dull ochreous with a series of dusky spots on its inner and outer edge; the terminal area is paler than the rest of the wing. The hind-wings are dark ochreous grey. In the female the fore-wings are very much paler, especially towards the base and dorsum, the ground colour is almost wholly pale, rusty ochreous, darker around the principal markings which are very much less distinct than in the male; there is a series of wedge-shaped blackish markings on the inner edge of the subterminal line.

The perfect insect appears in December and January. It is attracted by sugar.

Described and figured from specimens kindly supplied by Mr. Philpott.

The variety of the female from Arthur's Pass, originally described as *Persectania marmorata*, is depicted on Plate LI., fig. 27.

ICHNEUTICA NERVOSA.

(*Ichneutica nervosa*, Huds., Ent. Mo. Mag., lviii. 196.)

(Plate L., fig. 1 ♂.)

This very striking insect was discovered by Mr. F. S. Oliver on Bold Peak, at the head of Lake Wakatipu.

The expansion of the wings of the male is almost $1\frac{1}{2}$ inches. The fore-wings are bright ochreous with the veins heavily marked in clear white, with black markings between the veins; a small black spot at the base; an elongate blotch between vein 1 and the dorsum; two elongate marks between veins 1 and 2; wedge-shaped marks at the origins of veins 2, 3, 4 and 5; a large blotch between veins 5 and 6; a much smaller blotch between veins 6 and 7; two obscure elongate marks in disc immediately below middle of costa, and two obscure blackish lines between the costal and subcostal veins; a curved series of subterminal spots and a series of elongate terminal marks. The hind-wings are greyish-brown. The cilia of all the wings are whitish-ochreous. The head is pale brownish-ochreous. The thorax is densely clothed with brownish-ochreous hair with a brown horse-shoe-like mark in the middle. The abdomen is pale ochreous. The antennae, which are heavily bipectinated throughout, are reddish-ochreous.

The perfect insect appears in December. The single specimen, which was kindly lent to me by Mr. Oliver, was captured at night.

Genus 9.—LEUCANIA, Ochs.

Face without prominence. Antennae in male bipectinated with apex simple or ciliated. Thorax clothed with hair, without crests. Abdomen without crest.

A considerable genus of universal distribution as now restricted.

We have thirteen species in New Zealand. One is confined to the North Island, three to the South Island, eight are common to both islands, and one occurs on the Snares.

LEUCANIA PURDII.

(Leucania purdii, Fer., Trans. N.Z. Inst., xv. 195.)

(Plate VI., fig. 13 ♀.)

This large and conspicuous species has occurred on Mount Egmont, the Tararua Ranges and at Wellington, in the North Island. In the South Island it has been found at Dunedin, and in the Routeburn Valley, near the head of Lake Wakatipu.

The expansion of the wings is from 2 to 2½ inches. The fore-wings are dull brownish-crimson; there are two broad, shaded, yellow, longitudinal streaks above and below the middle; the costa is margined with yellow near the base, and the dorsum is yellow throughout its entire length; the cilia are deep orange. The hind-wings are dark grey, and the cilia yellow.

There is considerable variation in the extent of the clouded yellow longitudinal streaks.

The larva, according to Mr. Howes,* is about 2 inches in length, ochreous with a pink flush; there is a double brown dorsal line; another line from the eye with deep brown marks on each segment, and a brown lateral line with black dots on each segment. It feeds on *Astelia*, apparently during the winter months, becoming full-grown about the end of October. This caterpillar rests in a gap, cut out of the leaf of the *Astelia*, in which position it is extremely inconspicuous. It feeds by night, retreating into the interior of the plant during the daytime. The pupa is enclosed in a slight cocoon.

The perfect insect appears from December till March, but is rarely met with.

LEUCANIA ACONTISTIS.

(Leucania acontistis, Meyr., Trans. N.Z. Inst., xix. 9.)

(Plate VII., fig. 5 ♂.)

This rather obscure-looking species has occurred at Castle Hill, Ida Valley, Central Otago, Dunedin and Invercargill.

The expansion of the wings is about 1½ inches. The fore-wings are dull ochreous-brown; the veins are slightly darker; there is a fine black longitudinal stripe from the base to about ¾ and three very indistinct broad pale longitudinal bands, situated below the apex, along the centre, and above the dorsum respectively. The hind-wings are pale yellowish-grey. The cilia of all the wings are dull ochreous.

The perfect insect appears from October to January, frequenting open grassy country. It is usually taken at sugar.

LEUCANIA UNICA.

(Leucania unica, Walk., Cat. ix. 112; Butl., Voy. Ereb., pl. ix. 9. Meyr., Trans. N.Z. Inst. xix. 10. *Nonagria juncicolor*, Gn., Ent. Mo. Mag. v. 2.)

(Plate VI., fig. 2 ♂.)

This rather dull-looking species has occurred at Waiouru and Ohakune, in the North Island, and at Blenheim.

heim, Rakaia, Dunedin, Lake Wakatipu, Alexandra, and Maetown, in the South Island.

The expansion of the wings is slightly under 1½ inches. The fore-wings are dull ochreous brown; there is a rather thick blackish streak along the lower margin of the cell and the veins are irregularly dotted with blackish. The hind-wings are greyish-ochreous. The antennae of the male are shortly bipectinated.

Mr. Philpott points out that Dunedin examples are darker and have the veins less clearly marked with blackish than the mountain forms. There seems also to be a more frequent tendency to the presence of a subterminal series of black points across the wing.

The perfect insect appears from November till February. It is found on open tussock country, where it is usually taken at sugar.

This insect closely resembles *Leucania phaula*, but in that species the antennae of the male are dentate.

LEUCANIA PAGATA.

(Leucania pagata, Huds., Sub Ant. Islds. of N.Z., i. 67.)

(Plate IX., fig. 20 ♂.)

This species was discovered by Dr. Benham, on the Snare, during the scientific expedition to the islands south of New Zealand, in November, 1907.

The expansion of the wings is 1½ inches. The head and thorax are rather dark brownish-ochreous, very densely scaled, the latter with a slight anterior crest. The abdomen is paler. The antennae are reddish-brown, moderately bipectinated, the pectinations without citations. The forewings are rather broad, with the apex rounded, and the termen very oblique towards the tornus, brownish-ochreous slightly tinged with greenish; the markings are very obscure, consisting of four minute black dots marking the boundaries of the reniform stigmata, a group of blackish scales a little before the end of vein 1; four small patches of blackish scales between veins 2 and 3, 3 and 4, 4 and 5, 5 and 6 respectively. The hind-wings are rather dark brownish-ochreous, slightly reddish-tinged. The cilia of all the wings are ochreous.

This species is closely allied to *Leucania unica*, but may be distinguished by the slight greenish tinge, the absence of the ciliations on the pectinations of the antennae and the characteristic though minute blackish markings on the forewings.

Described and figured from the single specimen captured by Dr. Benham.

LEUCANIA TORONEURA.

(Leucania toroneura, Meyr., Trans. Ent. Soc. Lond., 1901, 565, Hamps, Cat. v., 591, pl. xvi. 1.)

(Plate VI., fig. 19 ♂.)

This very neatly-marked little species has occurred abundantly around Lake Pukaki, near Mount Cook.

The expansion of the wings is barely 1½ inches. The fore wings are pale dull ochreous with the veins clearly and continuously marked in blackish-grey; the cilia are ochreous, faintly barred with grey. The hind-wings are pale bronzy-ochreous-grey, with the veins slightly darker; the cilia are ochreous.

Easily recognised by its small size and the clear veining of the fore-wings. The perfect insect appears in

* Trans. N.Z. Inst., xvi. 98.

December, and frequents open tussock country, but is evidently very local.

LEUCANIA LISSOXYLA.

(*Leucania lissoxyla*, Meyr., Trans. N.Z. Inst., xliii. 70.)

(Plate VII., fig. 7 ♀.)

This species has occurred on the Tableland of Mount Arthur, but is very rare. It has also occurred on Flagstaff Hill, near Dunedin, and at Commissioner's Creek.

The expansion of the wings is slightly over 1½ inches. The fore-wings are rather bright brownish-ochreous with vein 1b, the upper and lower margins of cell, and veins 2, 3, 4 and 6, 7, 8 and apical third of vein 5 distinctly dotted in black and white. The hind-wings are ochreous clouded with grey on the disc and termen.

This is a brighter-looking insect than either *Leucania toroneura* or *L. unica*, and the antennal pectinations in the male are relatively longer than in either of those species.

The perfect insect appears in February and March. It is found on open grassy country, to about 4,000 feet above the sea-level.

LEUCANIA PHAULA.

(*Leucania phaula*, Meyr., Trans. N.Z. Inst., xix. 10; *dunedinensis*, Hamps., Cat., v. 591, pl. xcvi. 2; *neurae*, Philp., Trans. N.Z. Inst., xxxvii. 330, pl. xx. 5.)

(Plate VII., fig. 6 ♂.)

This species has occurred in the North Island near Rangataua. In the South Island it has been taken at Christchurch, Dunedin, Waipapa, and Invercargill.

The expansion of the wings is about 1½ inches. The fore-wings are dull brownish-ochreous, with the veins clearly indicated by black and white marks; there is a conspicuous white spot at the junction of veins 3 and 4 and frequently a second spot just inside this. The hind-wings are ochreous-grey, darker towards the termen.

This insect may be distinguished from *Leucania unica* by the distinct white dotting of the veins and the absence of pectinations in the antennae of the male.

The larva feeds on tussock-grass (*Poa caespitosa*).

The perfect insect appears from November till February, but is rarely met with.

LEUCANIA ALOPA.

(*Leucania alope*, Meyr., Trans. N.Z. Inst., xix. 10.)

(Plate VII., fig. 8 ♂.)

This rather bright-looking species has occurred in the North Island at Tokaanu and Ohakune. In the South Island it has been found at Lake Coleridge, Lake Guyon, Flagstaff Hill, Dunedin, Waipori, Paradise, Lake Wakatipu, and Wallacetown, near Invercargill.

The expansion of the wings is about 1½ inches. The fore-wings are dark reddish-brown; the first line is represented by three obscure black dots on the main veins; the orbicular is very small, very finely outlined in white; the reniform moderately large, dull yellowish towards the termen and irregularly marked with white dots; the second line is indicated by a curved series of black dots. The hind-wings are dark greyish-brown,

paler towards the base. The cilia of all the wings are dull reddish-brown.

Specimens from Lake Wakatipu are usually paler and have the stigmata more clearly defined.

The perfect insect appears from November till March.

LEUCANIA BLENHEIMENSIS.

(*Leucania blenheimensis*, Fer., Trans. N.Z. Inst. xv. 196; Meyr., ib. xix. 12.)

(Plate VII., fig. 9 ♀.)

This rather striking insect has occurred at Napier, Blenheim, Dunedin, Lake Wakatipu and Routeburn.

The expansion of the wings is about 1½ inches. The fore-wings are cream-coloured with the veins darker; there are three faint black dots at about one-third, a curved series of black dots near the termen, the termen itself being strongly shaded with dark greyish-brown; the cilia are dark greyish-brown. The hind-wings are grey, paler towards the base; the cilia are also grey.

The perfect insect appears from November till March.

Described and figured from a specimen in the Fereday collection.

LEUCANIA SEMIVITTATA.

(*Leucania semivittata*, Walk., Cat., xxxii. 628.)

(Plate VII., fig. 10 ♂.)

This species has occurred at Waitakerei, near Auckland, at Thames, Rangataua, and at Waiouru, in the North Island. In the South Island it has been taken commonly at Christchurch, Mount Torlesse, Dunedin, Lake Wakatipu and Invercargill. It is also found on Stewart Island.

The expansion of the wings is about 1½ inches. The fore-wings are pale ochreous; there is a very obscure, shaded, brownish, longitudinal streak below the middle, a conspicuous black dot at the base, a second at about one-sixth, a third at one-third, a fourth between the origins of veins 3 and 4, a curved series of minute subterminal dots, and a series of terminal dots. The hind-wings are much paler with a dark blotch near the middle. In the female all the wings are paler with the dots much smaller or absent.

The larva, which feeds on native grasses, is about 1½ inches in length, subcylindrical, slightly tapering at each end; dull green, very finely streaked with reddish-brown; the dorsal and sub-dorsal lines are indicated by fine double reddish lines; there is a series of white dots, one on each segment, except on the second and last; the lateral line is very distinct, dark reddish-brown, shaded with cream colour below; the spiracles are blackish; the under-side of the larva and the whole of the second segment is a paler and clearer green than the rest of the body.

The perfect insect appears from November till May, frequenting open grassy country, or grassy glades in forest. It is attracted by blossoms or sugar.

LEUCANIA SULCANA.

(*Leucania sulcana*, Fer., Trans. N.Z. Inst. xii. 267, pl. ix. 3; Meyr., Trans. N.Z. Inst. xix. 11.)

(Plate VII., fig. 11 ♀.)

This fine looking insect has occurred at Waitakerei, Feilding and Porirua in the North Island, and at Akaroa, Dunedin and Invercargill in the South Island.

The expansion of the wings is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. The fore-wings are light ochreous with the veins white; there is a shaded, brownish, longitudinal streak near the apex, another from the end of the cell to the termen, a stronger streak from the base of the wing to middle of termen, and another near dorsum; there is a minute black dot near the base above the middle, a slightly larger dot at about one-third, a conspicuous dot between the origins of veins 3 and 4, and a very minute dot on vein 6. The hind-wings are dark blackish-grey, with the cilia paler.

The larva, immediately before its last moult, is about 1 inch in length, rather stout, cylindrical, slightly tapering at each end; the head is greenish-white, with two faint streaks and a very faint mottling; the body bright green with a conspicuous pinkish-white lateral line; a fine double dark green dorsal line, and a very fine dark green subdorsal line; between the principal lines there are numerous very slender yellowish streaks and the segmental divisions are marked in yellow. The full-grown larva is about $1\frac{1}{4}$ inches in length, much attenuated posteriorly, pale reddish-ochreous, with numerous fine wavy darker lines; the subdorsal and lateral lines are straight and much more conspicuous; the spiracles are black, and there is a dark olive-green line down the midback. The food-plant is *Microlaena avenacea*, a broad-leaved native grass, common in open glades in the forest.

The pupa is buried in the earth.

The perfect insect appears in February, March and April, and is usually taken at sugar.

LEUCANIA STULTA.

(*Leucania stulta*, Philp., Trans. N.Z. Inst., xxxvii. 329, pl. xx. 1.)

(Plate VII., fig. 12 ♀.)

This rather dull-looking, but very distinct species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also been taken at Waipori, and, by Mr. Robt. Gibb, at Tuturau, in the same district. A much more brightly-coloured form of this species occurs on the lower slopes of Mount Ruapehu, in the North Island.

The expansion of the wings is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. The fore-wings are pale ochreous-brown; there is a very short brown streak near the termen below the apex; an almost continuous, slightly-curved fine dark brown longitudinal streak from near the base to the middle of the termen; a much shorter streak on the termen below this; a rather confused, cloudy, longitudinal brown streak from the base to the termen below the middle and a short brown streak on the dorsum at the base; between the brown streaks the ground-colour of the wing is almost white but the veins are slightly darker. The hind-wings are dull brown. The cilia of all the wings are pale dull ochreous.

The perfect insect appears from October till December, but is rarely met with.

LEUCANIA HARTI.

(*Leucania harti*, Howes, Trans. N.Z. Inst., xli. 95.)

(Plate IX., fig. 16 ♂.)

This species was discovered by Mr. S. Hart at the Cape Egmont Lighthouse.

The expansion of the wings is $1\frac{1}{4}$ inches. The fore-wings are silvery-grey, very slightly tinged with dark dull red; the basal, first and second lines are distinct dark red; the median shade is very conspicuous dark red; the orbicular is round the claviform conical, both outlined in dark red; the reniform is

large crescentic dark reddish towards the base, dull ochreous towards the termen; there is a series of indistinct reddish sub-terminal spots and a sub-apical blotch. The hind-wings are brownish-ochreous darker towards the termen. The head is grey, the thorax dark red and the abdomen pale ochreous-brown with a reddish terminal tuft.

The perfect insect appears in March, and is attracted by light.

Described and figured from the type specimen kindly lent to me by Mr. Howes.

Genus 10.—ALETIA, Hübn.

Face without prominence. Antennae in male ciliated or bipinnated with apex simple. Thorax clothed with hair or hair-scales with anterior and posterior spreading crests. Abdomen with small crest on basal segment.

(Plate C., fig. 11. Head of *Aletia nullifera*.)

A very large and cosmopolitan genus, represented in New Zealand by twenty-one species, of which two are restricted to the North Island, ten to the South Island, and nine common to both islands.

ALETIA MICRASTRA.

(*Leucania micrastra*, Meyr., Trans. Ent. Soc. Lond. 1897, 383.)

(Plate VII., fig. 13 ♀.)

This bright-looking species has occurred near Wellington, at Waipori, Central Otago, Gore and Invercargill.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are bright orange-brown, there are several white scales near the base, two black-edged white dots at about one-third, a small black spot with a shining white dot on each side of it at the origin of veins 3 and 4, and a series of black and white dots on all the veins near the termen; the cilia are orange-brown tipped with white. The hind-wings are pale ochreous-brown; the cilia are ochreous broadly tipped with white.

This species somewhat resembles *Leucania alopa* in general appearance, but the wings are narrower and the colour of the fore-wings is considerably brighter.

The moth appears from December till March, but is very rarely met with.

ALETIA UNIPUNCTA.

(*Leucania unipuncta*, Haw., Lepidoptera Britannica, p. 174, No. 37.)

Leucania extranea, Gn., Noct. I. 77; Butl., Voy. Erebb., pl. ix. 2; Meyr., Trans. N.Z. Inst. xix. 12.)

(Plate VII., fig. 14 ♀.)

This well-known cosmopolitan species appears to be generally distributed throughout both North and South Islands.

The expansion of the wings is $1\frac{1}{4}$ inches. The fore-wings vary from dull ochreous to bright reddish-ochreous; there are numerous indistinct blackish dots; the orbicular and reniform are almost round and slightly paler than the rest of the wing; there is a minute white dot immediately below the reniform and an obscure, oblique blackish line from the apex of the wing ending in a series of minute black dots; the termen is not indented. The hind-wings are grey, darker near the termen; the cilia are white.

Varies considerably in the ground colour and in the extent of the black speckling.

"The larva is extremely variable. Its usual colour is pale brown with a white dorsal line and several dark lines on each side. Young larvae closely resemble their food-plant in colour, and occasionally this is persistent throughout life. Feeds on various grasses."*

The perfect insect first appears about January, and continues in increasing numbers until the middle or end of April. It is often met with at sugar.

This species is of almost universal distribution, having occurred in Australia, Java, India, Europe, and North and South America. In England it is regarded as a great rarity.

ALETIA FIBRATA.

(*Aletia fibrata*, Meyr., Trans. N.Z. Inst., xlv. 22.)

(Plate VII., fig. 25 ♂.)

This obscure-looking species was discovered by Mr. F. G. Gibbs, on Mount Richmond, near Nelson, at an altitude of about 4,500 feet above the sea-level.

The expansion of the wings is slightly over 1½ inches. The fore-wings are pale grey speckled with darker grey, with blackish markings; there is an interrupted dentate basal line; the first line and stigmata are faintly indicated; the second line is very fine, strongly dentate, inwards-curved near the dorsum with the tips of the dentations marked by whitish-edged black points; there is a series of blackish terminal dots; the cilia are grey, faintly barred with darker grey. The hind-wings are ochreous-grey. The antennae of the male are strongly bipectinated.

The perfect insect appears in December.

ALETIA NULLIFERA.

(*Agrotis nullifera*, Walk., Cat. ix. 742; Butl., Voy. Erebe, pl. ix. 5.

Alysia speciosa, Gn., Ent. Mo. Mag. v. 3. *Leucania nullifera*, Meyr., Trans. N.Z. Inst. xix. 7.)

(Plate VI., fig. 14 ♂.)

This large but sombre-looking insect has occurred in the North Island at Taupo and Wellington. In the South Island it has been taken commonly at Mount Arthur, near Nelson, and in the Christchurch, Otago and Southland districts.

The expansion of the wings is from 2½ to 2¾ inches. The fore-wings are uniform dull grey, with a double row of very faint white sub-terminal spots; the hind-wings, head, thorax, and abdomen are pale grey.

In some specimens the fore-wings are quite destitute of markings, whilst in others the ground colouring varies considerably, and is occasionally dull brown instead of grey. Traces of transverse lines are also frequently present.

The larva is very stout, bright yellowish-brown, considerably paler on the under surface; the dorsal line is faintly indicated, the subdorsal and lateral lines are dull brown, with a chain of elongate white spots beneath each; the spiracles and dorsal surface of the posterior segments are black; there are also numerous white dots all over the larva.

This caterpillar feeds on spear-grass (*Aciphylla squarrosa*). It devours the soft, central portions of the "tussock," and its presence can generally be detected by

a quantity of pale brown "frass," or discoloration, which is usually visible near the bases of the leaves. Owing to the formidable array of spines presented by the spear-grass, this larva can have but few enemies. The presence of these spines makes the insect a difficult one to obtain without special apparatus. A pair of strong, sharp scissors, however, will enable the collector to cut off a sufficient number of "spears" to allow of the insertion of a small trowel or hatchet under the root. The plant can then be lifted out of the ground, and the larva afterwards carefully extracted from its burrow in the stem. These larvae are full grown in the autumn or early winter, which is consequently the best time to obtain them for rearing. The pupa is enclosed in a very loose cocoon amongst the rubbish around the roots of the spear-grass.

The moth appears from November till May. It is sometimes attracted by light. I have found it commonly on the Tableland of Mount Arthur at elevations of from 3,500 to 4,000 feet above the sea-level, where its food-plant also flourishes.

ALETIA MODERATA.

(*Agrotis moderata*, Walk., Cat., xxxii. 705; Meyr., Trans. N.Z.

Inst., xx. 45; *Eumichtis sistens*, Gn., Ent. Mo. Mag., v. 39;

Agrotis mitis Butl., Proc. Zool. Soc. Lond., 1877, 383, pl. xlii. 5; *Leucania griseipennis*, Huds., N.Z. Moths, 9.)

(Plate VII., fig. 15 ♂.)

Although nowhere abundant this species seems to be generally distributed throughout both North and South Islands.

The expansion of the wings is 1½ inches. The fore-wings are dull greenish-grey; there are two obscure blackish transverse lines near the base and several dull white dots; a very conspicuous transverse curved black shade near the middle, followed by an extremely jagged dull black and white transverse line, with black and white dots where it crosses the veins; there is another less jagged transverse line near the termen; the orbicular is oval, pale, edged with black; the reniform and claviform are also pale but inconspicuous; the cilia are tinged with brown. The hind-wings are grey with the cilia wholly white.

The perfect insect appears from November till March, and is usually taken singly, sometimes secreted in crevices under fallen logs. It has also been found in mountainous regions at altitudes of over 4,000 above the sea-level.

There has been much confusion in the nomenclature of this and the following species, although the insects themselves are abundantly distinct.

ALETIA GRISEIPENNIS.

(*Mamestra griseipennis*, Feld., Reiss. Nov. pl. cix. 22; *Chera virescens*, Butl., Cist. Ent. ii. 489.)

(Plate VII., fig. 16 ♂; Plate I., fig. 24 larva.)

In the North Island this fine species is very common on Mount Egmont, and has occurred at Waiouru, and on Mount Ruapehu. It seems to be generally distributed throughout the South Island, and is extremely abundant on the lower slopes of Mount Aorangi and Mount Earnings.

* Report of American Department of Agriculture, 1881, 93.

law, near Lake Wakatipu, at altitudes of about 3,000 feet above the sea-level.

The expansion of the wings is about 1½ inches. The forewings are dark bluish-grey, very sparsely speckled with silvery-white; the markings are blackish, more or less clouded with dull yellow; there is an indistinct double transverse line at the base; the first line is strongly dentate, also indistinct; the orbicular is round, thickly studded with whitish scales; there is a heavy jagged black transverse line across the middle of the wing; the reniform is often indistinct, partially clouded with dull yellow; the second line is very jagged with black and white dots at the extremities of the dentations; there are usually three cloudy black blotches on the sub-terminal line. The hind-wings are dark grey with grey cilia.

Sometimes the bluish-grey colouring is replaced by dull greenish-grey, but otherwise there are no important variations.

The egg is about one-thirtieth of an inch in diameter, spherical, much flattened; the micropyle is smooth with radiating ridges. Its colour is pale yellowish-white. When first hatched the larva is about $\frac{1}{16}$ inch long, of even thickness, pale greyish-green, with a very large ochreous head and whitish lateral line; the two first pairs of prolegs are imperfectly developed; there are four rows of conspicuous black warts, and the larva is armed with numerous short, stout bristles. The egg-shell is devoured on emergence, and the infantile larva is extremely active. The food-plant no doubt consists of native grasses. After the first moult, the larva is clear apple-green with four white lines, the two lateral lines being the thickest; the ventral surface is yellowish; there is a row of black warts on each segment, each wart emitting a moderately long black bristle.

The full-grown larva is about 1½ inches long, slightly attenuated posteriorly; the head is light green and shining; the body very vivid green, paler and bluer beneath; the second segment slightly yellowish; there is a very fine, white dorsal line, a conspicuous yellowish sub-dorsal line, a broad, white lateral line, and a series of minute whitish yellow specks between the lines; a few extremely minute bristles are situated above the lateral line, near the head and posterior extremity of the larva.

The perfect insect appears from November till March. It is usually found on open, grassy country, or in river beds, generally at considerable elevations and is much attracted by sugar, blossoms and light. It occasionally flies in the daytime. The colouring of the fore-wings is protective, resembling the blue rock surfaces on which the insect often rests.

ALETIA TEMENLAULA.

(*Leucania temenaula*, Meyr., Trans. N.Z. Inst., xxxix. 106.)

(Plate VII., fig. 18 ♂.)

This very distinctly-marked species has occurred at Rakaia, at Wedderburn and Mount Ida, in Central Otago, and at Dunedin and Lake Wakatipu.

The expansion of the wings is about 1½ inches. The forewings are pale grey with blackish markings; the first line is distinct, moderately waved; the orbicular almost round, whitish, edged with black; the claviform conical; the reniform large, ear-shaped, strongly margined with black towards the base and termen; there is a series of large black spots on the sub-terminal line, the spots gradually decreasing in size towards the dorsum; the sub-terminal line itself is whitish and there is a series of minute black terminal marks. The hind-wings are whitish-grey.

The perfect insect appears in March and April, and may be taken at sugar. It is found from sea-level to altitudes of about 3,000 feet.

ALETIA FALSIDICA.

(*Hyssia falsidica*, Meyr., Trans. N.Z. Inst., xliii. 70; *H. Hamiltoni*, Hamps., Ann. & Mag. Nat. Hist., xii. 594.)

(Plate VII., fig. 17 ♀.)

This fine species has occurred on the Tararua Ranges in the North Island and in the South Island on Mount Arthur and on the high country around the head of Lake Wakatipu.

The expansion of the wings is from 1½ to 1¾ inches. The forewings are pale grey thinly speckled with darker grey, the markings are black; there is a broken transverse line near the base; the first line, which is very deeply indented, extends from about $\frac{1}{4}$ of costa to $\frac{1}{2}$ of dorsum; the claviform is cone-shaped and the orbicular oval, both having whitish centres; the reniform is very large, ear-shaped, greyish-ochreous, containing a curved white line and surrounded by a blackish-brown shading; the second line is extremely jagged, blackish, irregularly edged with white; there is a very broad, conspicuous sub-terminal line, also strongly indented; a greyish terminal band and a series of black terminal dots. The hind-wings are greyish-ochreous, with a series of dark grey terminal dots. The cilia of all the wings are pale brownish-ochreous.

The perfect insect appears in February and is found on high, open, country at about 4,000 feet above the sea-level, but is very rarely met with. It is more frequently observed flying in the daytime than most members of the family.

ALETIA PACHYSCIA.

(*Leucania pachyscia*, Meyr., Trans. N.Z. Inst., xxxix. 106.)

This very obscure and doubtful species has occurred on Mount Arthur and on the high country around Lake Wakatipu at an elevation of about 4,700 feet above the sea-level.

It closely resembles *Aletia falsidica*, from which it is apparently distinguished by its smaller size, much less distinct markings, "whitish ground colour and strong dark praesubterminal shade."

The perfect insect appears in January, and is found on open country above the ordinary limit of forest.

ALETIA CUNEATA.

(*Aletia cuneata*, Philp., Trans. N.Z. Inst., xlviii. 420; *Aletia dentata*, Philp., ib. liv. 148.)

(Plate IX., fig. 19 ♀.)

This very distinct, though rather obscurely-marked species was discovered by Mr. J. H. Lewis at Ophir, Cen-

tral Otago. It has since been found on Mount Tongariro at an elevation of 5,000 feet, at Mactown, and on Ben Lomond, near Lake Wakatipu.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are greyish-ochreous, strongly clouded with brownish-ochreous in the disc; all the lines are very obscure; the orbicular is almost round, outlined in black towards the termen; the claviform very small with cloudy blackish edging; the reniform dull black; there is a cloudy median shade; all the leading veins are broadly marked in bluish-grey; a blackish patch is situated near the middle of the subterminal area, two at the tornus and another on vein 1 at the base of the wing. The hind-wings are greyish-ochreous with a very broad blackish terminal band.

This species is nearly allied to *A. griseipennis* but is smaller, and more ochreous-tinged; the dark reniform is a good distinguishing character. A variety, much darker than the type, with the fore- and hind-wings heavily suffused with blackish, was discovered by Mr. J. G. Myers, amongst rocks, on the slopes of Mount Tongariro, at an elevation of about 5,000 feet above the sea-level.* This form has since been taken, in similar situations, on Mount Ruapehu.

The perfect insect appears in January and February, and may be looked for on open country, between 2,000 and 5,000 feet above the sea-level.

ALETIA INCONSTANS.

(*Spactotis inconstans*, Butl., Cist. Ent., ii. 545 *Melanchra omicron*, Huds., N.Z. Moths, 22.)

(Plate VIII., fig. 29 ♂.)

This very obscure-looking species has occurred at Waiouru and Wellington in the North Island and at Ida Valley, Central Otago, in the South Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are pale grey faintly tinged with green mottled and striped with dull grey; the usual transverse lines are indistinct and slightly wavy; the orbicular is large, almost circular, sharply outlined in black; the claviform is small but distinct; the reniform rather large, ill-defined, obscurely outlined in black towards the base; there is a terminal series of small blackish marks. The hind-wings are dark grey, paler towards the base.

The perfect insect appears from November till February, and is taken at sugar. It is a rare species.

ALETIA PANDA.

(*Aletia panda*, Philp., Trans. N.Z. Inst., lii. 42.)

(Plate IX., fig. 9 ♂.)

This species has occurred on Mount Earnslaw, at Lake Harris and in the Routeburn Valley, Lake Wakatipu.

The expansion of the wings is slightly over $1\frac{1}{2}$ inches. The antennae of the male are bipectinated. The fore-wings are pale grey slightly clouded with ochreous in the disc and on subterminal area; the basal patch, stigmata and principal veins are white. The first line is obscure, indicated on the costa by two blackish bars and on the main veins by white marks; the orbicular is round, white, very imperfectly outlined with blackish and with a very faint central dot; the claviform is also white, half the size of the orbicular. There is a very wavy, narrow,

blackish median line, double below the reniform; the reniform is rather large white, surrounded first by a cloudy ochreous shading, and then faintly outlined in dark grey; the second and subterminal lines are obscure, dark greyish, dentate; the veins transversing the space between these lines are dotted with black; there is a series of obscure terminal dots; the cilia are grey. The hind-wings are ochreous-grey, darker towards the termen; the cilia are ochreous.

This species may be distinguished from the other very similar grey species by its clear white markings.

The perfect insect appears in January. It evidently ascends to considerable elevations, one specimen having been taken flying rapidly over flowers on the mountain side, at an elevation of 5,200 feet above the sea-level.

ALETIA GOURLAYI.

(*Aletia gourlayi*, Philp., Trans. N.Z. Inst. liii. 337.)

(Plate XLIX., fig. 31 ♂.)

This bright-looking species was discovered by Mr. Gourlay at Arthur's Pass.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are very pale cobalt blue with rather distinct black markings; the basal and first lines are clearly marked on the costa, the latter extending as a double broken line nearly to the middle of the dorsum; the claviform is obsolete; the orbicular moderate, distinctly outlined in black towards base and termen only; the reniform is large, ear-shaped, also outlined in black but only towards base and termen; there is a very distinct, very jagged transverse line from below reniform to the dorsum at about $\frac{1}{2}$; a large black, sub-apical patch and a much smaller tornal mark, a slightly wavy sub-terminal line joins these; inside the sub-terminal line there is a curved double series of indistinct blackish marks; a very clear series of black terminal dots; the cilia are very pale, rusty-ochreous mixed with blackish. The hind-wings are dark grey, darker towards termen; the cilia are cream-coloured.

The perfect insect appears in February, and frequents the flowers of *Dracophyllum*.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

ALETIA ACCURATA.

(*Aletia accurata*, Philp., Trans. N.Z. Inst., xlix., 239.)

(Plate XLIV., fig. 16 ♂.)

This very dull-looking species has occurred at Wanganui and at Titahi Bay, near Wellington.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are very deep ochreous grey, slightly brighter towards the tornus; the veins and stigmata are finely outlined in black and dull whitish; there is a short basal streak; the orbicular is very elliptical, its long axis parallel with the costa; the reniform is oblong, slightly bulged towards the base on its lower corner; the transverse lines and claviform are hardly visible. The hind-wings are dull brownish-grey.

The perfect insect appears in December.

ALETIA MUNDA.

(*Aletia munda*, Philp., Trans. N.Z. Inst., xlix., 239.)

(Plate XLIV., fig. 17 ♀.)

This very dark-looking grey species was discovered by Mr. H. W. Simmonds at Waiouru, in the central district of the North Island.

* *Aletia dentata* Philp., Trans. N.Z. Inst., liv. 148.

The expansion of the wings is nearly 1½ inches. The forewings are rather short with the termen rather oblique; *dull bluish-grey speckled with blackish-grey and with blackish markings*; the first line is thick and broken, consisting of five almost distinct curved spots; the orbicular is irregularly oval, margined first with cream-colour and then with blackish; the reniform is large, oblong, similarly margined on its sides only; the claviform is small, blackish, very indistinct; the second line is also indistinct; *there is a series of very distinct blackish, wedge-shaped sub-terminal marks, each with a small cream-coloured spot towards the termen*. The hind-wings are grey, paler towards the base.

The perfect insect appears in March.

ALETIA CUCULLINA.

(*Xylocampa cucullina*, Guen., Ent. Mo. Mag., v., 40; *Mamestra cucullina*, Meyr., Trans. N.Z. Inst., xix., 28; *Aletia funerea*, Philp., ib., lviii., 703.)

(Plate VII., fig. 19 ♂.)

This species has occurred at Mount Arthur, and at Rakai.

The expansion of the wings is 1½ inches. *The forewings are bluish-grey, speckled and dappled with dark brown*; there is a pale transverse line near the base, partially edged with black; the orbicular is round, containing a blackish dot in the middle; the reniform is elongate-oval, including a cloudy spot; the space surrounding the stigmata is clouded with dark brown; there is a terminal series of small blackish crescentic marks, and the cilia are dark grey. The hind-wings are brownish-grey; the cilia also grey tipped with white.

The perfect insect appears from January till March. I have taken it at light on the Tableland of Mount Arthur, at 3,600 feet above the sea-level.

A very handsome form of this insect, from the Mount Arthur Tableland, with the stigmatic region of the forewings heavily suffused with black, is described by Mr. Philpott as *Aletia funerea*.

ALETIA LONGSTAFFI.

(*Morrisonia longstaffi*, Howes, Trans. N.Z. Inst., xliii., 128, pl. 1, 3, Butterfly Hunting in many Lands, pl. vi. 3.)

(Plate IX., fig. 25 ♂.)

This neat-looking little species was discovered by Mr. Howes at Dunedin. It has also occurred at Silverstream and York Bay near Wellington, at Queenstown and at Paradise in the Lake Wakatipu district, and at Invercargill.

The expansion of the wings is barely 1½ inches. The forewings are *pale grey with very distinct dark brown markings*; there are two short, slender lines at the base; the first line is double, moderately waved; the orbicular oval rather faint; the claviform obscurely indicated by a curved line; *the reniform large*, very distinct and thickly outlined in blackish-brown; the second line is very faint; the sub-terminal line consists of a series of brown spots between the veins, the veins themselves being marked by elongate blackish dots. The hind-wings are brownish-grey.

The perfect insect appears in February and March.

ALETIA OBSECRATA.

(*Aletia obsecrata*, Meyr., Trans. N.Z. Inst., xli., 101.)

(Plate IX., fig. 17 ♂, 18 ♀.)

This rather obscure species has occurred on Ben Lomond and the Remarkable Mountains, Lake Wakatipu, at elevations of from 2,000 to 3,000 feet above the sea-level.

The expansion of the wings of the male is 1½ inches; of the female nearly 1½ inches. The forewings of the male are *elongate-oblong with the termen bowed; pale grey, more or less speckled with black and white*, with blackish markings; the basal and first lines are distinct, moderately dentate; *the median shade is very dark*; the claviform invisible and the orbicular indistinct; the reniform is large, oblong, with the corners slightly rounded, whitish outlined in black; the second line is distinct, dentate, with the space between its upper portion and the reniform clouded with dark greyish-ochreous; other portions of the forewings are also faintly tinged with ochreous; the veins are obscurely marked with black towards the termen and there is a terminal series of blackish dots. The hind-wings are very dark grey tinged with ochreous and shaded with blackish towards the termen. In the female the forewings are deep bluish-grey with blackish-grey markings; the transverse lines are very indistinct; the orbicular is elliptical; the reniform large, trapezoidal, with its angles rounded; there is a series of sub-terminal spots between the veins and a terminal series of blackish dots, the veins themselves being dotted with blackish-grey. The hind-wings are brownish-grey, paler towards the base.

Superficially this species somewhat resembles *Aletia longstaffi*, in which, however, the markings are deep brown in place of blackish. *Melanchra lithias* is also somewhat similar but its general colouring is much paler.

The perfect insect appears from November till February, and flies swiftly by day over *Dracophyllum* and other rough herbage on the mountain sides.

ALETIA PARMATA.

(*Aletia parmata*, Philp., Trans. N.Z. Inst., lvi., 387.)

(Plate X., fig. 25 ♂.)

This little species was discovered by Mr. S. Lindsay at Mount Grey, Canterbury.

The expansion of the wings is 1½ inches. The forewings are pale grey, thickly speckled with darker grey, the transverse lines and median shade being obscurely indicated by denser speckling; the orbicular and reniform stigmata are large, very conspicuous, finely outlined in black, and much paler in colour than the rest of the wing; the claviform is also outlined in black, wedge-shaped, obscure; all the veins are faintly marked in blackish. The hind-wings are dark ochreous-grey, paler towards base.

An obscure species, but apparently sufficiently distinct by its relatively small size and large reniform and orbicular stigmata.

The perfect insect appears in February.

Described and figured from specimen kindly lent by Mr. Philpott.

ALETIA SOLLENNIS.

(*Aletia solennis*, Meyr., Trans. N.Z. Inst., xli., 101.)

(Plate X., fig. 1 ♂.)

This very obscurely-marked species was discovered by Mr. H. Howes at Waipori, Central Otago.

The expansion of the wings is 1½ inches. The antennae are shortly ciliated. *The fore-wings are warm brownish-ochreous irregularly sprinkled with darker brown and pale ochreous scales; the second line and the edges of the reniform are very obscurely paler; the veins are faintly marked with grey and white dots; there is a curved series of small whitish spots on the veins at about ¾.* The hind-wings are dark brownish-ochreous, darker towards the termen.

The perfect insect appears in January and seems to be extremely rare.

This species closely resembles the common Australian *Dasygaster hollandiae*, which is, however, a redder insect, without the posterior series of whitish dots.

Described and figured from a specimen in Mr. Philpott's collection.

ALETIA EMPYREA.

(*Aletia empyrea*, Huds., Ent. Mo. Mag., liv., 61.)

(Plate X., fig. 14 ♂; 15 ♀.)

This large and handsome species was discovered by Mr. Charles E. Clarke in the Routeburn Valley at the head of Lake Wakatipu at an altitude of about 2,500 feet above the sea-level. It has also occurred at Lake Harris and at Queenstown.

The expansion of the wings is about 2 inches. *The fore-wings of the male are rather bright bluish-grey with blackish markings; the basal line is distinct, strongly dentate; the first line has four strong projections; the claviform is very narrow, blackish-edged and pale centred; the orbicular is large, trapezoidal-ovate whitish; a conspicuous blackish triangular spot is situated between the orbicular and the reniform, the reniform itself being very indistinct; the second line is strongly dentate and bent outwards above the middle; there is a series of faint blackish triangular marks on the sub-terminal area, and the veins are irregularly marked in blackish.* The hind-wings are pale grey, with a dark grey lunule and two cloudy grey bands. The female is considerably paler than the male and the markings are much less distinct.

The perfect insect appears in December.

Described and figured from specimens kindly lent to me by Mr. Clarke.

Genus 11.—PHYSETICA, Meyr.

Face without prominence. Antennae in male ciliated. Palpi in male with terminal joint greatly dilated, with orifice on outer side (instead of apex). Thorax clothed with hair without crests. Abdomen with small crest on basal segment.

Plate C., fig. 8. Head of *Physetica caerulea*.)

An endemic genus represented by a single species.

PHYSETICA CAERULEA.

(*Agrotis caerulea*, Gn., Ent. Mo. Mag. v. 38. *Physetica caerulea*, Meyr., Trans. N.Z. Inst. xix. 5; *Physetica hudsoni*, Howes, ib., xxxviii., 510.)

(Plate VII., figs. 20-22 varieties.)

This fine species has occurred in the South Island at Blenheim, Rakaia, Waiho Gorge, Mactown, Alexandra, Matura, the Routeburn Valley, Lake Wakatipu and Ore-puki.

The expansion of the wings is 1½ inches. *The fore-wings are slaty-blue; there are two very wavy blackish lines at about one-third, a dark shaded line across the middle, containing the orbicular spot, then a very wavy line followed by a darker space and a wavy, dull, whitish terminal line.* The hind-wings are dark grey, paler near the base, the cilia shining white.

This species is extremely variable. In some specimens the markings are very indistinct; others have the ground colour of the fore-wings pale whitish-blue, whilst in others they are dull ochreous, specimens of every intermediate tint being met with. A magnificent series of this insect, taken at Mactown by Messrs. H. Hamilton and F. S. Oliver, is in the Dominion Museum and has furnished the material for the figures contained in this work.

The perfect insect appears from October till April, and is much attracted by sugar. It is a very local species and uncertain in its appearance, but, on rare occasions and in restricted localities, has been met with in abundance.

Genus 12.—DIPAUSTICA, Meyr.

Face with strong horny bifurcate process. Antennae in male ciliated. Thorax clothed with hair and hair scales, with strong triangular divided anterior crest. Abdomen with crest on basal segment. Anterior tarsi with spines unusually small and slight.

A distinct endemic genus represented by one species.

DIPAUSTICA EPIASTRA.

(*Leucania epiastrea*, Meyr., Trans. N.Z. Inst., xliii., 58.)

(Plate X., fig. 4 ♂; Plate I., fig. 17 larva.)

This fine insect was discovered by Mr. R. M. Sunley, who reared numerous specimens from larvae found at Makara. Stray examples of the moth have since been taken at Waimarino, Rangataua, several localities in the immediate vicinity of Wellington, Waiho Gorge and at Dunedin.

The expansion of the wings is 1½ inches. *The fore-wings are pale brown with a broad, cloudy longitudinal streak, containing two white dots near the middle of the wing; there are numerous minute blackish specks, especially on the central area; two black dots indicate the position of the first line and a curved row of similar dots marks the second line; there is also a series of terminal dots.* The hind-wings are dark, brownish-grey, with pale brown cilia tipped with white.

Varies slightly in the extent and intensity of the dark central streak, and in the depth of the general ground colour.

The egg is spherical, flattened at the base, and rather coarsely ribbed, the ribs radiating from the micropyle. The colour is at first uniform pale yellow, but after a few days the micropyle becomes dark brown and a dark-brown circle appears round it.

The young larva, when first hatched, is about ¼ inch in length, dull ochreous, with one row of black warts round the thoracic segments, and two rows round the abdominal segments, each wart emitting a stout black bristle. It eats the egg-shell on emergence and is very active.

The full-grown larva is 1½ inches in length, dull brownish-green in colour, sometimes tinged with reddish-brown, especially on posterior segments. The dorsal and sub-dorsal lines are very

narrow, but fairly well marked; dull white in colour, faintly edged with red or reddish brown. The lateral line is somewhat indistinct, white in colour. On it are situated the spiracles, which are dull cream-colour edged with black. The lateral line is often edged with small brown blotches situated above the spiracles, and on the anterior segments these blotches are sometimes joined to form a broad, faintly marked upward edging to the lateral line. The integument, especially on the dorsal surface, has a number of fine white branching veins, and on each segment is a number of minute black dots from which spring short brown bristles. The prolegs are of the same colour as the body, edged with dark-brown hooks. The head is horny, amber in colour, mottled and netted with brown.

The food plant is toe-toe grass (*Arundo conspicua*), the larva feeding by night, but secreting itself at the bases of the leaves during the day time, where it is well protected from enemies.

When about to change into a pupa this insect makes its way into the flower stem eating through the soft interior and forming a chamber 2 in. or 3 in. long between two joints. It now loses its green colour, and changes to a pale dull brownish-yellow, the dorsal surface often strongly tinged with pink. This pink tinge becomes very marked as the time of pupation approaches. The larva spends some weeks in the stem, and before changing to a pupa cuts a neat round hole through the stem, near the top of its chamber, leaving only a very thin film of the outermost layer intact. It then retires to the bottom of the chamber, and in a few days changes to a pupa, which rests on the old larval skin, head upwards.

The pupa is very robust, and is at first light brown in colour, but soon becomes very dark brown and highly polished.

After about six weeks the imago emerges, and, breaking its way through the thin film covering the exit from its chamber, crawls out and clings to the stem till its wings have expanded and hardened sufficiently for it to fly. The emergence usually takes place between 7 and 9 o'clock in the evening.

The perfect insect appears from October till March. It is very sluggish in its habits and consequently rarely observed. The eggs are deposited in the summer, or autumn, the larvae feeding up during the winter and early spring.

Described and figured from specimens kindly given to me by Mr. Sunley, to whom I am also indebted for the interesting life history.

Genus 13.—PERSECTANIA, Hamps.

Face with slight rounded or sub-truncate prominence with ridge below it. Antennae in male ciliated, or bipectinated, with apex simple. Thorax clothed with hair and hair-scales, with anterior and posterior crests. Abdomen with crest on basal segment.

We have eight species in New Zealand.

PERSECTANIA DISJUNGENS.

(*Heliophobus disjungens*, Walk., Cat. xv., 1681; Butl., Voy. Ereb., pl. ix. 1. *Hadena nervata*, Gn., Ent. Mo. Mag. v. 40. *Mamestra disjungens*, Meyr., Trans. N.Z. Inst. xix. 15.)

(Plate VII., fig. 23 ♀.)

This very clearly-marked species has occurred at Waimarino, Waikouru and Ohakune in the central region of the North Island, and at Rakaia, Ashburton, Dunedin, Wedderburn, Waipori, Lake Wakatipu and Tuturau (Mataura), in the South Island.

The expansion of the wings is about 1½ inches. The forewings are brownish-grey; the veins are very conspicuously marked in white, the orbicular and reniform are large, white, each with a dusky centre; there is a conspicuous, white, sub-terminal line, emitting two white, tooth-like projections on veins 3 and 4, and connected with a longitudinal line running to the base of the wing. The hind-wings are grey with the cilia white.

The perfect insect appears from November till January, ascending to 5,500 feet above the sea-level. Although formerly a common species near Rakaia, it is, generally speaking, a rare insect. I have observed that specimens from the South Island are slightly paler in colour than those from the North Island.

PERSECTANIA STEROPASTIS.

(*Mamestra steropastis*, Meyr., Trans. N.Z. Inst. xix. 22.)

(Plate VII., fig. 24 ♀; Plate I., fig. 28 larva.)

This insect has occurred in the North Island at Thames, Waikouru, Waimarino, Napier, Ohakune and Mt. Hector, Tararua Range. In the South Island it has been taken at Blenheim, Takaka, Christchurch, Dunedin and Invercargill, but does not seem to be a common species anywhere.

The expansion of the wings is from 1½ to 1¾ inches. In general appearance it resembles the next species, from which it may chiefly be distinguished by the absence of the sharp white central line and conspicuous tooth-like markings near the termen. There is also a minute white dot situated at the junction of veins 3 and 4 of the forewings. The hind-wings are dark grey.

The larva, which feeds on the toe-toe grass (*Arundo conspicua*) and flax (*Phormium tenax*) is about 1½ inches in length, of almost uniform thickness, considerably flattened; the head is ochreous, the body very pale ochreous-brown; there are no distinct markings on the thoracic segments, except a few minute black dots round the middle of each; the rest of the body is covered with a number of very fine blackish lines, which become darker posteriorly, and are stronger on the dorsal and lateral regions; there is a row of minute black dots round the middle of each segment; the spiracles are black and the underside of the larva is faintly tinged with green.

During the day the larvae hide away in the old sheaths at the base of the plants, coming out after dark and feeding along the margin of the leaves, in which they cut deep V-shaped incisions.

The perfect insect appears from November till March. I am indebted to Mr. Philpott for specimens of the larva.

PERSECTANIA COMPOSITA.

(*Cloantha composita*, Guen., Noct. ii., 114; *Anchmis composita*, Walk., Noct., 616; Butl., Voy. Erebb., pl. ix., 12; *ewingi*, Westwd., Proc. Ent. Soc., ii., 55, pl. xx. 1; *aversa*, Walk., Cat. ix., 113; *Mamestra maori*, Feld., Reis. Nov., pl. cix. 24; *Leucania dentigera*, Butl., Cist. Ent., ii. 542; *peracuta*, Morr., Bull. Buff. Soc. Nat. Sci. ii., 114; *Mamestra composita*, Meyr., Trans. N.Z. Inst., xix. 22.)

(Plate VII., fig. 27 ♀.)

One of the most abundant of our night-flying moths, occurring in great profusion throughout the country. It is also found on Stewart Island and in the Chatham Islands.

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are pale reddish-brown, irregularly streaked with white. There are two elongate, pointed, white markings touching the termen below the middle, and a central white streak, interrupted in the middle, by a minute semicircular white mark, which represents the lower portion of the reniform spot; the orbicular and claviform spots are obsolete. The hind-wings are dark grey. The head and thorax are reddish-brown, and the abdomen is dark grey. The antennae are serrate in the male but simple in the female. In some specimens the white markings are more extensive than usual, but otherwise there are no important variations.

The egg is almost globular, creamy-white, covered with extremely shallow, irregular hexagonal depressions.

The larva is bright reddish-brown; the dorsal stripe is broad and black; the subdorsal narrower, edged with white; the lateral lines are dull red, white, and black; the ventral surface, head, legs, and prolegs are greenish-grey with black markings; the spiracles are black.

This caterpillar varies considerably in the intensity of the light and dark markings. It feeds on grasses in January and September, and is very active. It often occurs in prodigious numbers, and at such times may frequently be seen travelling at a great rate over bare ground in search of food. Amongst the grass it is hard to detect, as the striped colouring is very protective in that situation.

The pupa state is spent in the earth, or under moss on fallen trees.

The moth appears from September till May. It is double-brooded. A few of the second brood emerge in the autumn and hibernate as moths, but the majority pass the winter in the pupa state. Hence we sometimes meet with specimens on mild evenings in the middle of winter.

This insect is much attracted by light, and occasionally assembles in vast numbers round a brilliant lamp. I have had as many as one hundred specimens in my verandah at Karori, attracted during two or three hours. It is by far the commonest insect at the collector's sugar, the numerous visitors of this species eagerly jostling each other in their haste to obtain a share of the sweets. *P. composita* is likewise observed in the utmost profusion on attractive flowers of all kinds, crowding out the rarer and more aristocratic species. Mr. Hanify has drawn my attention to the remarkable habit this insect has of sud-

denly stopping during its flight, and thus eluding pursuit. It also takes wing with unusual rapidity. Specimens of this moth may constantly be observed at rest in various situations during the daytime, when the protective character of the colouring will be at once apparent, especially when the insect is partially concealed amongst grass. Mr. Meyrick informs us that this species is common in Tasmania and South-Eastern Australia.

PERSECTANIA SIMILIS.

(*Persectania similis*, Philp., Trans. N.Z. Inst. iv., 207.)

This insect was discovered by Mr. Philpott at Goulard Downs, near Nelson. It has also occurred on Mount Ruapehu at an altitude of 4,000 feet above the sea-level. Very like *Persectania composita*, but stated to be narrower-winged and without the peculiar reniform of that species. The general colouring is also considerably brighter than is usual in *P. composita*.

PERSECTANIA AROTIS.

(*Leucania arotis*, Meyr., Trans. N.Z. Inst. xix. 11. *Leucania dulacis*, Meyr., Trans. N.Z. Inst. xix. 11. *Leucania obsoleta*, Howes, Trans. N.Z. Inst., xxxviii., 511; *Leucania innotata*, ib., xl., 534.)

(Plate VII., fig. 26 ♂.)

This species has occurred at Waimarino, Waiouru and at Wellington, in the North Island. In the South Island it has been found at Blenheim, Christchurch, Rakaia, Dunedin and Invercargill.

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are very pale brown or cream-colour with the veins finely marked in grey; there is a series of darker streaks between the veins, and a curved row of black dots marking the second line; the cilia are cream-colour. The hind-wings are dark grey with the cilia white.

The perfect insect appears from September till April. It is a very scarce species.

PERSECTANIA ATRISTRIGA.

(*Xylina atristriga*, Walk., Cat. xxxiii., 756. *Mamestra antipoda*, Feld., Reis. Nov., pl. cix. 23. *Leucania atristriga*, Meyr., Trans. N.Z. Inst. xix. 8.)

(Plate VII., fig. 28 ♂.)

This bright-looking species is very common in the North Island in the neighbourhood of Wellington, and has been found at Auckland, Rotorua and Thames. In the South Island it has occurred abundantly at Nelson, Christchurch, Lake Coleridge, Dunedin, Lake Wakatipu and Invercargill, and has also been found on Stewart Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are rich reddish-brown; there is a broad bluish-grey longitudinal streak on the costa, reaching nearly to the apex, and a very broad, pale brown, longitudinal shading on the dorsum; there is a conspicuous longitudinal black stripe in the middle of the wing from the base to one-third, the orbicular, reniform, and claviform spots are bluish-grey, edged with black, the transverse lines are very indistinct; the cilia are reddish-brown. The hind-wings are dark grey with the cilia ochreous.

This species varies considerably in the intensity of its markings, in the extent of the bluish costal streak, and in the general ground colour which, in some specimens, is dull brown giving the insect quite a dingy appearance.

The moth first appears about January and continues in great abundance until the middle or end of April. It is extremely partial to the flowers of the white rata (*Metrosideros scandens*), where, on warm, still evenings, it may be often met with in the utmost profusion. It also comes freely to sugar, and is sometimes attracted by light.

PERSECTANIA PROPRIA.

(*Leucania propria*, Walk., Cat. ix. 111; Gn., Ent. Mo. Mag. v. 2; Butl., Voy. Erebb., pl. ix. 4; Meyr., Trans. N.Z. Inst. xix. 9.)

(Plate VII., fig. 29 ♂.)

This insect has occurred in the South Island at Mount Arthur, Blenheim, Mount Hutt, Dunedin, Central Otago, Lake Wakatipu, and Invercargill. It is also found in the Chatham Islands.

The expansion of the wings is $1\frac{1}{2}$ inches. The forewings are pale ochreous; there is a conspicuous longitudinal black streak in the middle of the wing, extending from the base to about one-third, and a broad, dark brown longitudinal shading, slightly above the middle, from one-fourth to the termen; the reniform is rather small, dull grey, faintly edged with darker, the orbicular and claviform are very indistinct or absent; there is a transverse series of black dots on the veins a little before the termen, and another series on the termen; the cilia are ochreous banded with brown. The hind-wings are pale grey, with a terminal series of small black marks; the cilia are ochreous. The head and thorax are pale reddish-brown, and the abdomen is ochreous.

This species varies considerably in the depth of its colouring. Some of the darker forms closely resemble certain varieties of *P. atristriga*, but Mr. Philpott has pointed out that the black basal streak terminates abruptly in *P. propria*, but tapers to an acute point in *P. atristriga*.

The perfect insect is met with from January till April, and may be collected at sugar, or blossoms. On the Mount Arthur Tableland it occurred very commonly at about 3,800 feet above the sea-level. In this locality it was freely attracted by light, and large numbers of specimens were captured by the aid of a single candle, exhibited at the tent door during mild evenings.

PERSECTANIA BASIFASCIA.

(*Persectania basifascia*, Hamps. Ann. Mag. Nat. Hist., xii. 598.)

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are pale grey slightly tinged with red-brown and sparsely irrorated with black; a strong black fascia in submedian fold to below origin of vein 2; a minute, sub-basal black spot in the cell; antemedial line represented by black points on costa and vein 1 and an oblique striga above dorsum; orbicular and reniform small, incompletely defined by black, the former very narrow and elongate, a black streak between them in lower part of cell and beyond the reniform to the postmedial line with a diffused dark shade below it; postmedial line black, rather interrupted, bent outwards below costa, then strongly dentate, oblique below vein 4; sub-terminal line indistinct, pale, somewhat den-

tate, defined on inner side by diffused black-brown; a terminal series of small black lunules. Hind-wing whitish suffused with pale red-brown, the cilia white; the underside white, faintly tinged with red-brown, a small brown discoidal spot, a slight postmedial line excurved below costa, then oblique and ending at vein 4, a terminal series of blackish lunules from apex to vein 2, then a dark line.

I am unacquainted with this species. The above particulars have been taken from the original description.

Genus 14.—ERANA, Walk.

Face without prominence. Antennae in male with scattered cilia. Thorax clothed with scales, with anterior and posterior spreading crests. Abdomen with strong dorsal crests towards base. Fore-wings with vein 10 not connected with 9 to form areole, in male beneath with very long tuft of scent producing hairs from basal area. Hind-wings in male with costal area broadly expanded.

(Plate C., figs. 9, 10 neuration of *Erana graminosa*.)

We have one species representing this interesting endemic genus.

ERANA GRAMINOSA.

(*Erana graminosa*, Walk., Cat. xi. 605; *Erana vigens*, ib., xxxiii. 743. *Erana graminosa*, Meyr., Trans. N.Z. Inst., xix. 28.)

(Plate VII., fig. 30 ♂, 31 ♀; Plate I., fig. 30 larva before last moult; 31 full-grown larva.)

This very beautiful species appears to be fairly common in many forests in the North Island having been taken at Thames, Waimarino, Wanganui, Masterton, Palmerston and Wellington. In the South Island it has occurred in the Marlborough District and at Christchurch and Dunedin.

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are bright green; there are three paler green transverse lines, edged with black; one near the base of the wing, one just beyond the reniform spot, and one close to the termen; this last is inwardly much clouded with dark olive-green; the reniform spot is pale green, edged with black. The hind-wings are very broad, pinkish-brown, tinged with green on the termen. In the female the hind-wings are considerably narrower, and are not so strongly tinged with green as in the male.

The egg is about $\frac{3}{16}$ inch in diameter, semi-globose, much flattened beneath, pale green, the whole surface covered with minute irregular hexagonal depressions which radiate from the micropyle.

When first excluded from the egg the young larva is about $\frac{1}{4}$ inch long, and of a very pale green colour. After the first moult it is bright green, darker towards the head, with white dorsal, subdorsal, and lateral lines; there are eight rows of shining black spots, each spot emitting a number of stout black bristles; the head is yellowish-brown with a few black dots. After the last moult the larva has a totally different appearance. It is pale green, marbled with darker green; there is often a whitish lateral line, and a series of dark green, or blackish, spots on the sides of each segment; the whole larva is also considerably speckled with black. Sometimes the larva has a pinkish-brown tinge and there are often two or three rows of pale spots. In fact the full-grown caterpillar is very variable.

At this stage the larva is sluggish in its habits, resting on the moss-covered stems of its foodplant, *Melicytus*

ramiflorus, where its colouring affords it most efficient protection. The length of the full-grown larva is about $1\frac{3}{4}$ inches.

These larvae hibernate during the winter months, often secreting themselves in the burrows which have been made in the stems of the *Melicytus* by various species of wood-boring insects. They come abroad about the end of August, and are full grown early in October. The pupa state is spent in the earth.

The perfect insect appears from October till April. It is often found at rest on tree-trunks in the daytime, where its beautiful green colouring causes it to closely resemble a patch of moss. It is freely attracted by sugar, and found abundantly on the flowers of the white rata, especially towards the end of the season. The appearance of the moth over such a prolonged period indicates a succession of individuals, almost throughout the entire year, but it is not clear that there are two distinct broods in a season, although there is no doubt that the insect passes the winter in the larval state.

The remarkable tuft of long hairs, on the underside of the fore-wings of the male, is the source of a very strong vanilla-like perfume, which scents the box in which the specimens are contained for more than a week after their death; the scent is excited more strongly, even in the dead specimen by stirring the tuft with a pin.

Genus 15.—MELANCHRA, Hübn.

Face without prominence. Antennae in male ciliated, or bi-pectinated with apex simple. Thorax clothed with hair and scales, with anterior and posterior crests. Abdomen with dorsal crests towards base.

(Plate C., figs. 6, 7 neuration of *Melanchra mutans*.)

A very large genus of universal distribution, but chiefly in temperate regions. We have no less than fifty-two species, some of which are very difficult to discriminate. Of these, four are restricted to the North Island, thirteen to the South Island, and thirty-three occur in both islands. The two remaining species are confined to the Chatham and Auckland Islands respectively.

MELANCHRA PICTULA.

(*Dianthoeicia pictula*, White, Trans. New Zeal., pl. 1. 3. *Meterana pictula*, Butl., Proc. Zool. Soc. Lond., 1877, 386, pl. xlii. 1. *Mamestra pictula*, Meyr., Trans. N.Z. Inst. xix. 18.)

(Plate VII., fig. 33 ♂.)

This very handsome species has occurred in the South Island at Lake Coleridge, Hunter River, North Otago, Macetown and on Ben Lomond, Lake Wakatipu, at an elevation of about 2,500 feet above the sea level.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are dark grey, very faintly tinged with purplish, the markings are yellowish-green margined with black, the reniform is large, oval, clear white, with a minute white dot above and below it, there is a series of conspicuous black-edged yellow spots near the termen; the cilia are grey barred with yellow,

with a series of minute black and white dots at their origin. The hind-wings are pale crimson shaded with dark grey near the termen, there is an obscure grey discal spot; the cilia are grey. The sides of the abdomen are bright crimson.

The perfect insect, appears from November till April, and may be taken at sugar, but is a very rare species.

MELANCHRA RHODOPLEURA.

(*Mamestra rhodopleura*, Meyr., Trans. N.Z. Inst., xix. 19.)

(Plate VII., fig. 32 ♂; Plate I., figs. 32, 33 larvae.)

This very beautiful insect is commonest in the North Island where it has been taken at Auckland, Napier, Tokaanu and Wellington. In the South Island it has occurred at Claremont, North Canterbury.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are dark greyish-green with very numerous yellow and black markings, the stigmata and transverse lines being clearly marked by chains of bright yellow and black spots. The hind-wings are dark grey, the cilia are also grey with a series of minute yellow dots. The sides of the abdomen are bright crimson.

This insect is very closely allied to *Melanchra pictula* but the absence of the white reniform spot and the grey hind-wings, will at once distinguish it from that species.

The larva, which was discovered by Mr. R. M. Sunley,* feeds during the spring and early summer on *Pimelea prostrata*, a dwarf shrubby plant, often growing plentifully on the sea-beach, just above high-water mark. When full-grown it is a very handsome caterpillar measuring about $1\frac{1}{2}$ inches in length, moderately stout, slightly attenuated at each end; its general colour is very dark rich velvety-green, darker on the back; there is a broad, white lateral line bordered above with black and beneath with yellow; a fine yellow sub-dorsal line; a conspicuous dorsal line splashed with yellow in the middle of each segment and finely edged with black; there are numerous black warts, each emitting a slender black bristle; the dorsal portion of the larva is finely streaked with blackish. This larva is somewhat variable; one very beautiful variety is yellowish-green, with a broad white line, and bright yellow blotches down the mid-back; there is a dark olive-green subdorsal band, mottled with blackish; a fine bright yellow subdorsal line; a clear white lateral line, edged beneath with brilliant orange-red; the ventral surface of the larva is green tinged with orange, with a few black dots; the head is pale green with black dots, and the second segment much clouded with pale green. (Plate I., fig. 33.)

The pupa is enclosed in a cocoon beneath the surface of the ground.

The perfect insect appears in January, and is sometimes met with as late as May, or even June. It seems to be a rare species, but might perhaps be more freely taken by systematic sugaring in the localities where its foodplant is abundant.

MELANCHRA EXQUISITA.

(*Melanchra exquisita*, Philp., Trans. N.Z. Inst., xxxv. 246, pl. xxxii. 2.)

(Plate VIII., fig. 1 ♂.)

This very beautiful little species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also been found at Waiuku, Waitomo and Wanganui in

*Trans. N.Z. Inst., xliii., 129.

the North Island, and in the South Island at Poulburn, Central Otago, Alexandra and Queenstown, Lake Wakatipu.

The expansion of the wings is slightly over 1 inch. *The fore-wings are bright pea green with numerous brownish-black markings; the first line, orbicular and reniform are broadly outlined in black, the space between the first and second lines being almost entirely blackish, except an irregular band of green below the stigmata; there is a curved series of white spots along the outer edge of the second line; three blackish blotches are situated on the subterminal line, each blotch containing one or two white spots; the cilia are greenish-white with heavy blackish-brown bars.* The hind-wings are grey-whitish clouded with brown towards the apex and termen; there is a wavy line across the middle, a grey lunule and a terminal series of dots; the cilia are white barred with blackish.

The perfect insect appears from October till February, and has been taken at sugar. It is evidently a very rare species.

MELANCHRA PAUCA.

(*Melanchra pauca*, Philp., Trans. N.Z. Inst., xlii. 544.)

(Plate VIII., fig. 6 ♂.)

This very striking species has occurred at Ohakune, Wanganui, and in the Wairarapa district in the North Island. In the South Island it has been found on Mount Greenland, at Wallacetown, near Invercargill, and Orepuki.

The expansion of the wings is nearly 1½ inches. *The fore-wings are cream-coloured, very strongly tinged with green, with heavy purplish-brown and dark olive-green markings; the basal area is purplish-brown, except a small irregular patch of pale green near the base; the orbicular and claviform are large, confluent, pale green, surrounded with purplish-brown towards costa and dark olive-green towards dorsum; the reniform is almost oblong, pale green, with a large pale green blotch below it reaching as far as the dorsum; there is a large oblong patch of pale green on the dorsum near the middle; the subterminal area is deep olive-green, with a large oblong patch of pinkish-brown next reniform; a conspicuous purplish-brown blotch on termen below apex, and a series of blackish terminal marks.* The hind-wings are grey, with strong yellowish-brown reflections.

The perfect insect appears from December till March. It seems to be a very rare species.

Described and figured from specimens kindly supplied by Messrs. Drew and Watt.

MELANCHRA OCTANS.

(*Melanchra octans*, Huds., N.Z. Moths, 25.)

(Plate VIII., fig. 2 ♀.)

This distinctly marked little species was discovered by Mr. Philpott, at Mount Linton, near Invercargill. It has also occurred at Wanganui, Dunedin, Orawia and Orepuki.

The expansion of the wings is 1½ inches. *The fore-wings are pale ochreous-brown; there are several wavy brown transverse lines near the base, two lines at about one-third, then a large V-shaped white mark extending almost from the costa and touching the dorsum; the orbicular and reniform spots are situated in the middle of this mark, the orbicular is very finely outlined in brown, and contains a black dot towards the base*

of the wing; the reniform is large, dark brown, surrounded by a large triangular dark brown shading; there is an obscure subterminal line; the termen is slightly indented. The hind-wings are dark brown, paler towards the termen.

This species may be immediately recognised by the large, white, V-shaped marking on the fore-wings.

The perfect insect appears from September till March.

Described and figured from a specimen kindly given to me by Mr. Philpott.

MELANCHRA GRANDIOSA.

(*Melanchra grandiosa*, Philp., Trans. N.Z. Inst., xxxv. 246, pl. xxxii. 1.)

(Plate VIII., fig. 9 ♀.)

This very handsome and conspicuous species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also occurred at Alexandra, Queenstown, and Mace-town.

The expansion of the wings is about 1½ inches. *The fore-wings are very deep rich purplish-brown; there is a short, broad black basal streak with a yellowish-brown patch above it; the dorsum is margined with yellowish-brown; there is a very large triangular patch of velvety-brown in the disc; the orbicular is large, somewhat bell-shaped, yellowish-brown; the discal portion of the reniform is pale ochreous, oblong and very narrow but the outer portion, which is very large, is hardly distinguishable from the purplish ground colour; the terminal area is deep reddish-brown with an oblique wavy fainter line dividing it from the discal area.* The hind-wings are greyish-brown faintly tinged with reddish.

The perfect insect appears in May, and has been captured at sugar.

MELANCHRA MAYA.

(*Melanchra maya*, Huds., N.Z. Moths, 17.)

(Plate VIII., fig. 8 ♀.)

This rather striking-looking species has occurred on Mount Egmont and at Rangataua in the North Island. It appears to be widely distributed throughout the mountainous regions of the South Island, occurring at altitudes ranging from 2,000 to 4,000 feet above the sea-level. It has been taken on the Tableland of Mount Arthur, at Mace-town, and on the lower slopes of Mount Earnslaw, at the head of Lake Wakatipu.

The expansion of the wings is 1½ inches. *The fore-wings are bright yellowish-brown, paler towards the apex; there are two broad, shaded, black stripes at the base; a small stripe near the middle edged with yellow above, and a large one below the middle edged with yellow beneath; the stigmata are dark purplish-brown, the orbicular is semi-circular, oblique, edged with black except towards the costa; the claviform is rather irregular; the reniform is very large, edged with black; there is a large elongate patch of very dark brown at the tornus, partly edged first with yellowish and then with black; another smaller patch is situated on the termen near the middle, bisected by a fine yellow line.* The hind-wings are grey; the cilia of all the wings are yellowish-brown. The head and thorax are purplish-brown, the abdomen dull brownish-grey.

This species varies considerably in the ground-colour, which ranges from pale straw-colour to bright reddish-ochreous. The markings also vary in intensity.

The perfect insect appears from September till March, and may be taken at evening dusk on *Veronica* blossoms, or at sugar.

MELANCHRA INSIGNIS.

(*Euplexia insignis*, Walk., Cat., xxxiii. 724; *Morrisonia insignis*, Hamps., Cat., v. 368, pl. lxxxviii. 20; *Xylina turbida*, Walk., Cat. xxxiii. 754; *Hadena skelloni*, Butl., Cist. Ent., ii. 547; *Mamestra polychroa*, Meyr., Trans. N.Z. Inst., xix. 16.)

(Plate VIII., fig. 10 ♂; 11, 12 ♀ varieties; Frontispiece, figs. 7 and 8 egg.)

This pretty species seems to be common and generally distributed throughout the country, and has been found in the Chatham Islands.

The expansion of the wings is about 1½ inches. *The forewings are pinkish-brown*; there is a short black streak near the centre of the wing at the base, and a cloudy shading along vein 1; the orbicular, reniform, and claviform spots are large, margined first with green and then with black; there is a fine, paler subterminal line edged with green, and broken by two sharp, tooth-like markings; beyond this the ground colour of the wing is much darker. The hind-wings are dull brown, darker towards termen; the cilia are brown with white tips. The antennae of the male are slightly bipectinated, the length of the pectinations being variable. The general colouring of the female is usually darker than that of the male; the outer portion of the reniform is often filled in with clear white and, in some specimens, the fore-wings are more or less suffused with bluish-grey with the ground colour rusty-ochreous.

There is great variation in this insect. Some males are suffused with rusty-ochreous with the markings beyond the reniform obsolete. In all the forms the two tooth-like breaks in the subterminal line are conspicuous and constitute a good distinction between this species and the numerous varieties of *M. mutans*.

The egg is semi-globose, considerably flattened above and beneath. A number of branching ribs radiate from the micropyle, the spaces between them being slightly ribbed transversely. Its colour is pale green, becoming dark brown in the centre as the enclosed embryo develops. The young larvae emerge in about a fortnight. At this time the two anterior pairs of prolegs are very short, causing the caterpillar to loop up its back when walking. In colour the young larva is pale brown, with numerous black warts emitting several long, stiff bristles. It is very active, and busily devours the soft green portions of the leaves, leaving the harder membrane untouched. Twelve days later the larva becomes pale green in colour, and moults for the first time, after which traces of subdorsal and lateral lines present themselves. Growth then proceeds with great rapidity, and in another eleven days the larva again sheds its skin. The last moult occurs a fortnight later.

The full-grown larva is pale greenish-brown, inclining to yellow on the ventral surface. The lateral lines consist of a series of black markings near the posterior margin of each segment; the subdorsal lines are represented by four oblique black marks on each side of the four posterior segments of the larva. The region between these lines is much clouded with yellowish-green or pink, the larvae having a tendency to diverge into pink and green varieties. The anal segment is dull yellow. The head is brown, with two black stripes and several black dots.

These larvae feed on a variety of low plants. They are only abroad at night, remaining underground or closely

secreted amongst the stems of their foodplant during the daytime, and hence they are very rarely observed. The pupa state is spent in the earth.

The perfect insect may be found almost throughout the entire year, coming freely to both sugar and blossoms. It is most abundant in the autumn and early winter.

MELANCHRA XANTHOGRAMMA.

(*Melanchra xanthogramma*, Meyr., Trans. N.Z. Inst.,

xliv. 117.)

This species, which has occurred at Wellington, Nelson and Waiho Gorge in company with *Melanchra insignis*, is stated to be distinguished from that species by its shorter antennal pectinations and the absence of the well-defined basal streak of fore-wings. Mr. Philpott has pointed out to me that in addition to these characters *M. xanthogramma* differs from *M. insignis* in having narrower fore-wings; more prominent palpi, perhaps owing to the second joint being less hairy beneath. The hair on the eyes is also shorter and less dense than in *M. insignis*. I am, however, unable to satisfactorily separate the two forms by the characters assigned to them.

MELANCHRA PLENA.

(*Evana plena*, Walk., Cat. xxxiii. 744. *Mamestra sphagnea*, Feld., Reis. Nov., pl. cix. 17. *Dianthoeccia viridis*, Butl., Cist. Ent., ii. 547. *Mamestra plena*, Meyr., Trans. N.Z. Inst. xix. 17.)

(Plate VIII., figs. 3, 4 ♂ varieties. Plate I., fig. 25 larva.)

This pretty green species seems to be common and generally distributed throughout the country. It also occurs on Stewart Island.

The expansion of the wings is from 1½ to 1¾ inches. It closely resembles *Melanchra insignis* except that the head, thorax and fore-wings are entirely suffused with green; there is no central black streak at the base, and the orbicular, reniform, and claviform spots are smaller.

There is considerable variation in the depth of the green colouring and in the extent and intensity of the blackish markings. Some female specimens are very thickly speckled with blackish-grey, and in these the white reniform and pale subterminal lines are very conspicuous.

The larva, which feeds on the common fuchsia (*Fuchsia excorticata*), as well as on low plants, is about 1½ inches in length, of fairly uniform thickness, slightly attenuated towards the head and thickened posteriorly. Its general colour is pale pinkish-brown becoming pale green on the ventral surface; there is an obscure wavy blackish lateral line, stronger near the middle of each segment; a wavy blackish subdorsal line stronger near the middle of the posterior segments and appearing from above as a series of very slightly oblique blackish marks. This larva has been found in November and in March, so that it is probable there are at least two broods in the year. It is sluggish in habit, secreting itself during the daytime, and only coming abroad to feed at night. The pupa is enclosed in the earth.

The perfect insect appears from October till May, and is occasionally taken at sugar. Specimens are sometimes noticed in the middle of winter, the insect hibernating as an imago during that season. It may also be found resting on tree-trunks in the forest, where it is very hard to see owing to its close resemblance to a patch of moss.

MELANCHRA PRAESIGNIS.

(*Morrisonia praesignis*, Howes, Trans. N.Z. Inst., xliii, 128.)

(Plate IX., fig. 12 ♀; 29 ♂; Plate XLVIII., fig. 6 pale variety.)

This very handsome species was discovered by Mr. Howes at Orepuki. It has also occurred at Dunedin, Maccetown, Mount Cleughearn, and on Bold Peak, Lake Wakatipu.

The expansion of the wings is about 1½ inches. The forewings of the female are *very rich chocolate-brown with bright green markings*; the basal line is distinct, the first line wavy very strongly bowed; *there is a large bright green patch in the middle of the dorsum*; the claviform is marked by a distinct dark brown semi-circular line; the orbicular is large, nearly round, pale greenish; the reniform large, irregular whitish, *with two minute white dots below it*; the second line is pale greenish very jagged; the veins are dotted in white and grey; there is a very conspicuous, broad, bright green terminal band; the termen is wavy with dark chocolate-brown cilia. The hind-wings are very dark grey, slightly flushed with pinkish ochreous, darker towards the termen; the cilia are pinkish-ochreous. In the male the forewings are warm brownish-ochreous, darker towards the base and the markings much less distinct than in the female. Both sexes seem to be variable, some examples being very much paler than others.

The perfect insect appears from September till March, and is attracted by sugar.

Described and figured from a female specimen kindly lent to me by Mr. Howes.

MELANCHRA CHLORODONTA.

(*Morrisonia chlorodonta*, Hamps. Ann. Mag. Nat. Hist., viii, 423.)

(Plate IX., fig. 10 ♂.)

This very beautiful and distinctly-marked species was discovered at the Cape Egmont lighthouse. It has also occurred at Ngāruawahia, Taumarunui, on Mount Egmont, Ohakune, and at Eketahuna, near Wellington, but is evidently an extremely rare insect.

The expansion of the wings is almost 1½ inches. The forewings are *very deep chocolate brown*; a small basal patch, *the lower half of the median band, the outer portions of all the stigmata and a very strongly-toothed subterminal band are all vivid greenish-yellow*; the first and second lines are finely marked in blackish-brown; there is a series of blackish terminal marks; the cilia are chocolate-brown finely barred with ochreous. The hind-wings are deep warm brown, darker towards the termen; the cilia are pinkish-brown.

The perfect insect appears from February till April, and is attracted by light.

Described and figured from a specimen kindly lent to me by Mr. Howes.

MELANCHRA MUTANS.

(*Hadena mutans*, Walk., Cat. xl., 602; *Morrisonia mutans*, Hamps. Cat., v. 369, pl. xxxviii. 21; *Hadena lignifusca*, Walk., Cat., xl. 603; *Xylina spurcata*, ib., xl. 631; *Xylina varata*, ib. xxxiii, 755; *Mamestra angusta*, Feld., Rels. Nov., pl. cix. 18; *M. acceptrix*, ib., pl. cix. 19; *Hadena debilis*, Butl. Proc. Zool. Soc. Lond., 1877, 385, pl. xlii. 6; *Mamestra mutans*, Meyr., Trans. N.Z. Inst., xix. 17.)

(Plate VIII., fig. 13 ♂, 14 ♀; Plate IX., fig. 21 variety; (Plate I., fig. 27 larva.)

This is an extremely abundant species throughout the country, and is found on Stewart Island.

The expansion of the wings is about 1½ inches. The forewings are pale reddish-brown in the male, grey in the female; the markings are black and somewhat indistinct; the orbicular spot is nearly round, the claviform semicircular, the reniform large and not margined with black towards the termen; the subterminal line emits on its outer edge a blunt tooth-like mark; inside this line the ground colouring of the wing is sometimes lighter; there is a rather conspicuous blackish streak just above the tornus and the veins are strongly dotted with blackish, especially towards the termen. The hind-wings are grey, darker in the male; the cilia are white with a cloudy line. The head, thorax, and abdomen are brown in the male, grey in the female. The antennae are slightly bipectinate in the male.

This species varies much in the ground colouring of the forewings, especially in the male, where it ranges from pale pinkish-brown to dark brown. The wings of the female are frequently much clouded with dark grey. (See Plate IX, fig. 21). Specimens of the female from high altitudes are often more silvery in appearance than those from the lowlands, and this form has been recently described by Mr. Philpott, as a distinct species, under the name of *Melanchra furtiva*. (Trans. N.Z. Inst., LV., 663.)

The larva is rather stout, with the anterior segments wrinkled. It varies much in colour; the dorsal surface is usually reddish-brown; the lateral line is broad and black; a series of subdorsal stripes also black; the ventral surface is green. Sometimes these markings are hardly visible, and the larva is entirely green, whilst occasionally the brown colouring predominates.

It is a sluggish caterpillar, and feeds on low plants (*Plantago*, &c.) during the whole of the spring and summer. It often frequents the luxuriant growth surrounding logs and stones which have been left undisturbed.

The pupa state is spent in the earth or amongst moss on fallen trees. When this stage occurs in the summer it is of short duration, but in the case of larvae becoming full grown in the autumn, the regular emergence does not take place until the following spring.

The moth may be observed on mild evenings all the year round, but is commonest during the late summer and autumn. It is an extremely abundant species, and is very often seen resting on tree trunks during the daytime, in which position the colouring of both sexes will be seen to be very protective.

MELANCHRA BEATA.

(*Melanchra beata*, Howes; Trans. N.Z. Inst. xxxviii. 510.)

(Plate X., fig. 2 ♂.)

This species was discovered by Mr. Howes at Ototara, near Invercargill. It has also occurred at Hastings and at Kapuka and Dunedin.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are warm brown, slightly tinged with pink and faintly clouded with ochreous near the reniform; the stigmata are faintly but clearly outlined with whitish and dark brown scales; the transverse lines are indistinct, except the subterminal line which is broad, dark brown, edged with whitish towards the termen; it is partly broken below the middle, and below this it has a strong triangular projection inwards. The hind-wings are greyish-brown, slightly darker towards the termen.

The perfect insect appears in October and November, and has been taken on blossoms in forest.

This species has many points in common with *Melanchra insignis*, of which it may ultimately prove to be a variety, although Mr. Philpott, who has seen a series, is convinced it is distinct.

Described and figured from a specimen in Mr. Philpott's collection.

MELANCHRA OLIVEA.

(*Melanchra olivea*, Watt, Trans. N.Z. Inst., xlviii. 413.)

(Plate IX., fig. 30 ♂, 31 ♀; Plate XLIV., fig. 32 ♀ variety.)

This fine species was discovered by Miss Olive Shaw on Mount Egmont, at an altitude of about 3,300 feet above the sea-level. It has also been taken at Dunedin, and at Queenstown, Lake Wakatipu.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female $1\frac{1}{4}$ inches. The antennae of the male are deeply serrated with the serrations finely ciliated. The fore-wings are purplish-brown or greyish-brown; there is a short, deep brown basal streak; the first line is waved, slightly oblique, extending from $\frac{1}{2}$ of the costa to $\frac{3}{4}$ of dorsum; the claviform is minute; the orbicular large, oval, oblique, open towards costa; the reniform very large, ear-shaped, also open towards costa, its lower portion often bent inwards towards base of wing and inwardly edged with whitish towards the termen; both reniform and orbicular are sharply outlined in very dark rich brown; there is also a darker greyish-brown cloud partly enveloping the lower portions of both stigmata; the median shade is warm brown, scarcely visible in the male; the second line is brown finely waved indistinct except near the dorsum; the subterminal line is rusty-brown, obscurely edged with whitish-ochreous, with two blunt tooth-like projections before the tornus; the terminal area is obscurely clouded with blackish. The hind-wings are dark greyish-brown, paler towards the base.

This species is very variable. Some of the males are a very rich deep brown tinged with claret colour. The females are generally paler than the males. Some specimens, apparently more frequently met with in the south, have the fore-wings bluish-grey with reddish-brown markings, and the lower portion of the reniform strongly bent inwards. (Plate XLIV., fig. 32). Others are much paler grey.

The perfect insect appears from December till March, frequenting open country near forest. It is freely attracted both by sugar and light.

Described and figured from specimens kindly furnished by Messrs. Howes and Watt.

MELANCHRA EREBIA.

(*Melanchra erebia*, Huds., Subantarctic Islands of New Zealand, 1, 68.)

(Plate X., fig. 3 ♀.)

This species was discovered by Mr. R. Browne in the forest on the shores of Erebus Cove, Port Ross, Auckland Island, during the scientific expedition of November, 1907.

The expansion of the wings is a little over $1\frac{1}{2}$ inches. The head is very roughly scaled, with tufts of scales at the bases of the antennae, brownish-red mixed with black. The palpi are rather short, slender, tipped with dull white. The antennae are serrate, each serration being clothed with two extremely fine hairs. The thorax is reddish-grey, with moderate anterior crest and two rather prominent reddish-brown and black lateral markings. The abdomen is dull brownish-grey. The fore-wings are moderately broad, with the apex rounded and the termen moderately bowed; dull grey with black markings, speckled with reddish-brown scales, especially near the base; a broad, much-broken transverse line at the base; a wavy, broad, shaded transverse line at about $\frac{1}{2}$ connected with the first transverse line near the costa and dorsum; a broad pale central band; a branched transverse line, the two branches starting at $\frac{3}{4}$ and $\frac{1}{2}$ of costa respectively, uniting near the middle of the wing, and reaching the dorsum at about $\frac{3}{4}$; this line is very deeply indented towards the termen; a subterminal row of blackish dots. The hind-wings are dark brownish-grey. The cilia of all the wings appear to be pale brownish-ochreous.

Described and figured from the single specimen taken by Mr. Browne which, unfortunately, is in poor condition.

MELANCHRA BROMIAS.

(*Melanchra bromias*, Meyr., Trans. Ent. Soc. Lond., 1902, 273; Hamps., Cat., v. 370, pl. lxxxviii. 22.)

(Plate VIII., fig. 15 ♀.)

This very dull and obscurely-marked species appears to be common in the Chatham Islands.

The expansion of the wings is slightly under $1\frac{1}{2}$ inches. The fore-wings are dark brown slightly purplish-tinged, paler below the apex and on the reniform and orbicular stigmata; the first line is very obscure; the claviform indistinct edged with blackish; the reniform and orbicular are also narrowly edged with blackish; there is a cloudy patch on the lower half of the reniform; the subterminal line is usually broken into a series of ochreous dots; there is a very faint tooth-like projection and a dark shading above the tornus. The hind-wings are brown, darker towards the termen.

Varies in colouring like its New Zealand allies. This species is nearest to *M. mutans* with which it agrees in the rather peculiar character of the single prominent dentation of the subterminal line, but is darker and duller coloured, without the black supraternal streak of that species, and differing also by the blackish posterior margin of the reniform.

The perfect insect appears in December and January and is attracted by light.

MELANCHRA MOLLIS.

(Melanchra mollis, Howes, Trans. N.Z. Inst., xl. 533; xlv. 204.)

(Plate IX., fig. 27 ♂.)

This obscure-looking though distinct species was discovered by Mr. Howes at Dunedin. It has also occurred at Kaitoke and Titahi Bay, near Wellington, and at Christchurch and Wallacetown, near Invercargill.

The expansion of the wings is about 1½ inches. The forewings are very pale brownish-ochreous, slightly tinged with yellowish-orange in the disc; the transverse lines and stigmata are very faintly and finely outlined in pale brown; there is a rather conspicuous brown patch on the outer fourth of the dorsum continued as a very oblique wavy interrupted band towards the apex; this band is traversed throughout by a wavy, paler line; the veins are faintly dotted with blackish and there is a series of minute black terminal dots. The hind-wings are pale ochreous, clouded with grey towards the termen.

The perfect insect appears in December. It seems to frequent cultivated districts, but is apparently rarely met with.

MELANCHRA USTISTRIGA.

(Xylina ustistriga, Walk., Cat. xl. 630; Morrisonia ustistriga, Hamps., Cat. v. 377, pl. lxxxviii. 29; Mamestra ustistriga, Meyr., Trans. N.Z. Inst., xix. 26; Xylina lignisepta, Walk., Cat. xl. 631.)

(Plate VIII., fig. 16 ♂, 17 ♀. Frontispiece fig. 6 egg; Plate I., fig. 29 larva.)

This beautiful insect seems to be fairly common and generally distributed throughout the country.

The expansion of the wings is about 1½ inches. The forewings, head, and thorax are pinkish-grey in the male, pale grey in female; the orbicular spot is rather large, nearly round, finely outlined in black; the reniform is very large, margined with black towards the base of the wing, and usually touching the orbicular spot or connected with it by a short black line; the claviform is triangular, also black margined; there are two cloudy oblique lines below the reniform, and a very indistinct, irregular subterminal line. The hind-wings and abdomen are pale pinkish-grey in male, dull grey in female; the cilia are white with a cloudy line.

This insect varies in the general depth of the colouring; also in size, especially in the female.

The egg is semi-globose, pale green, with numerous branching ribs radiating from the micropyle and faint transverse ribs between them.

The larva is dull greyish-brown with blackish subdorsal and lateral lines; there is a series of pale spots below the sub-dorsal line, and an obscure whitish streak below the lateral line. It feeds on *Mühlenbeckia* and honeysuckle (*Lonicera*) during the late summer.

The perfect insect is very irregular in its appearance, but is commonest in the autumn. It passes the winter both as a pupa and a moth. It is attracted by sugar and light, and may also be found at rest on fences and tree trunks in the daytime.

MELANCHRA AVERILLA.

(Melanchra averilla, Huds., Ent. Mo. Mag. lvii. 255.)

(Plate XLIX., fig. 18 ♀.)

This species was discovered by Miss Averil Lysaght on Mount Egmont at an altitude of about 3,000 feet.

The expansion of the wings of the female is about 1½ inches. The forewings are pinkish-brown, much suffused with grey towards the base and termen; the principal markings are finely outlined in black; there is a conspicuous curved longitudinal streak from the base to about ¾; the first line is very indistinct; the claviform is small, cone-shaped; the orbicular large, irregularly oval, almost completely outlined in black; the reniform also large, outlined in brown towards base, but otherwise indicated by faint grey shading; the second line is faint, grey, sharply bent inwards before the dorsum; there is a series of dark-margined whitish subterminal dots and a dark V-shaped spot above the tornus; the tornal area is clouded with brownish-ochreous. The cilia are also brownish ochreous. The hind-wings are greyish-ochreous, darker towards the termen.

This species is closely allied to *Melanchra ustistriga* but may be easily separated from that species by its conspicuous black basal streak, less distinct markings, smaller and less pointed claviform stigmata and paler colouring.

The perfect insect appears in December.

Described and figured from specimens kindly supplied by Miss Lysaght.

MELANCHRA PARACAUSTA.

(Mamestra paracausta, Meyr., Trans. N.Z. Inst. xix. 15.)

(Plate VIII., fig. 23 ♂, 24 ♀.)

This interesting species has occurred in the North Island at Ohakune and on Mount Ruapehu. In the South Island it has been found at Mount Arthur, Castle Hill, Macetown, and Invercargill. It is probably generally distributed in the far south.

The expansion of the wings is about 1½ inches. The forewings are dull white with an irregular, central, longitudinal, blackish-brown streak becoming very broad towards the termen; there is an oval, reddish-brown blotch near the base; the transverse lines and stigmata are sometimes faintly outlined in reddish-brown but are often obsolete; two conspicuous elliptic, white marks are situated on the termen near the tornus. The hind-wings are pale grey, with an obscure central shade and a series of brownish dots along the termen.

The species appears somewhat variable. In mountain specimens the white colouring is largely replaced by pale yellowish-brown, or ochreous grey, and the blackish-brown median streak is often absent.

The larva, according to Mr. Philpott, is about 1½ inches long, dull whitish, with the dorsal and sub-dorsal lines slightly darker; the lateral stripe is more pronounced, and the whole larva is finely speckled; the head is pale brownish with darker markings, and the dorsal surface of the second segment is also darker.

The perfect insect appears from October till February, and is attracted by sugar and light. It is essentially a southern and mountain species, but is seldom abundant.

MELANCHRA OLIVERI.

(*Morrisonia oliveri*, Hamps., Ann. Mag. Nat. Hist., 1911, 424.)

(Plate VIII., fig. 18 ♀.)

This handsome and very distinctly-marked species was discovered by Mr. F. S. Oliver on Bold Peak, Humboldt Range, Lake Wakatipu at an elevation of 3,500 feet above the sea-level. It has also occurred at Nelson, Waiho Gorge, and the Routeburn Valley beyond the head of Lake Wakatipu.

The expansion of the wings is $1\frac{1}{4}$ inches. The fore-wings are rather pale greenish-brown with pale ochreous and black markings; the costa is broadly edged with ochreous; the terminal area is mostly ochreous from about $\frac{1}{4}$ on the costa to about $\frac{1}{2}$ on the dorsum; there is a short, broad, black basal streak, the orbicular and reniform are very distinct, very irregularly oval, the orbicular filled with ochreous, the reniform with pale purplish-grey; two transverse series of blackish spots are placed obliquely beyond the middle of the wing; the spots composing the inner series are small and crescentic, the outer larger and wedge-shaped; there is a large, purplish-brown, semicircular blotch on the termen below the apex and a terminal series of blackish marks; the veins are strongly marked in whitish-ochreous. The hind-wings are dark ochreous-grey, paler towards the body.

The perfect insect appears in December, and is found amongst sub-alpine scrub above the line of ordinary forest. It frequents the flowers of the mountain veronicas in the evening.

MELANCHRA COELENO.

(*Melanchra coeleno*, Huds., N.Z. Moths, 26.)

(Plate VIII., fig. 20 ♂.)

This rather narrow-winged distinctly-marked little species has occurred at Titahi Bay, Wellington, Nelson, Christchurch, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is $1\frac{1}{8}$ inches. The fore-wings are very pale brownish-cream-colour; there is a large, irregular dark brown patch on the dorsum from about one-eighth to about two-thirds, another smaller patch at the tornus, and another still smaller on the termen a little above the middle; there are two very obscure transverse lines; the orbicular is elliptical, finely outlined in brown; the reniform contains two very dark brown dots, and is rather strongly outlined in brown towards the base. The hind-wings are dark grey. The cilia of all the wings are grey with a paler line.

Varies considerably in the ground colour of the fore-wings, which is sometimes tinged with pale reddish-brown; or very pale greenish on costa and dorsum.

The perfect insect appears from September till January. It is a rare species.

MELANCHRA INCHOATA.

(*Melanchra inchoata*, Philp., Trans. N.Z. Inst., lii. 43.)

(Plate XLVIII., fig. 31 ♂, 32 ♀.)

This species was discovered by Mr. H. Hamilton on Stephens Island, Cook Strait.

The expansion of the wings is slightly over $1\frac{1}{2}$ inches. The fore-wings are ochreous-brown, paler in the male, slightly clouded

with darker brown on the terminal and subterminal areas; the first line is very indistinct edged with blackish; the orbicular nearly round, very pale with double blackish centres; the claviform cone-shaped, small, dark brown; the reniform blackish, irregularly edged with paler; the area around the stigmata is clouded with dark brown; there is a conspicuous, fine, whitish subterminal line; the terminal area is mottled with brown and the termen itself rather strongly scalloped. The hind-wings are brown.

The perfect insect appears in September.

Described and figured from specimens in the Dominion Museum.

MELANCHRA PANSICOLOR.

(*Morrisonia pansicolor*, Howes; Trans. N.Z. Inst., xliv. 204.)

(Plate IX., fig. 8 ♀.)

This species was discovered by Mr. Howes near Dunedin.

The expansion of the wings is about $1\frac{1}{4}$ inches. The fore-wings are rather elongate with the termen slightly bowed and strongly scalloped; pale brownish-ochreous with reddish-brown markings; the transverse lines are strongly dentate with a few blackish dots at the indentations; the reniform is rather large, irregularly clouded with dark greyish-brown towards the base; the other stigmata are indistinct; beyond the second line the veins are clearly indicated by a series of elongate black marks; there is a series of blackish terminal dots and the cilia are warm ochreous-brown. The hind-wings are pale ochreous clouded with greyish towards the apex and termen. In the female the abdomen is pale ochreous sparsely speckled with blackish scales, in the male reddish-ochreous with strong crests.

The perfect insect appears in October and November, and may be taken at sugar.

Although smaller, this species is very like the somewhat variable female of *M. pascoi* but Mr. Philpott, who has seen a number of specimens, assures me it is a distinct species.

Described and figured from a specimen in Mr. Philpott's collection.

MELANCHRA DIATMETA.

(*Melanchra diatmeta*, Huds., N.Z. Moths, 21.)

(Plate VIII., fig. 7 ♂.)

This very distinctly-marked species has been taken at Rangataua, Wanganui, in the neighbourhood of Wellington and at Christchurch. According to Mr. Philpott it is generally distributed throughout Otago.*

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are reddish-brown; there is a short longitudinal black streak near the base, an obscure yellowish-green transverse line at about one-fourth, and several short oblique brown or yellow marks on the costa; the orbicular is oval, oblique outlined very distinctly in yellowish-green; the reniform is greenish-white, margined with yellowish-green towards the base of the wing; there is a black longitudinal streak on the dorsum, at the base, which bends upwards at about one-fourth, and runs in a somewhat curved direction to a little above the tornus. The veins are faintly marked in black; and there are several large yellow-

*Trans. N.Z. Inst., xlix., 199.

ish-green dots between the veins near the termen; the termen itself is slightly indented, the cilia are reddish-brown. The hind-wings are greyish-brown with the cilia reddish. There are two very conspicuous curved brown and yellowish green stripes on each side of the thorax.

The perfect insect appears from September till March. It is a rare species.

MELANCHRA DECORATA.

(*Melanchra decorata*, Philp., Trans. N.Z. Inst., xxxvii. 328, pl. xx. 2.)

(Plate VIII., fig. 5 ♂.)

This species was discovered by Mr. Philpott at West Plains, near Invercargill, and is generally distributed throughout Otago. In the North Island it has been taken at Wanganui and Tokaanu.

The expansion of the wings is 1½ inches. The fore-wings are pale brownish-ochreous clouded with dark brown near the dorsum; there is a very irregular pale stripe below the dark brown which is bent sharply upwards before the tornus; a fine, very wavy, broken, brown longitudinal line above vein 1; the orbicular is very elliptical; the reniform is large, almost oval, both being outlined in brown; there is a cloudy brown shading connecting the orbicular and the reniform; except near the apex, the subterminal line is marked by a series of brown spots; most of the veins are indicated by faint brown and whitish lines. The hind-wings are ochreous, broadly clouded with greyish-brown towards the termen. The male usually has a slightly greenish tinge, absent in the female. The reniform in the female is almost white.

This species somewhat resembles *Melanchra diatmeta*.

The perfect insect appears from August till March, and is taken at sugar. It is a rare species.

MELANCHRA INFENSA.

(*Orthosia infensa*, Walk., Cat. xi. 748; *Morrisonia infensa*, Hamps., Cat., v. 376, pl. lxxxviii. 27; *Mamestra arachnias*, Meyr.; Trans. N.Z. Inst., xix. 23.)

(Plate VIII., fig. 19 ♂.)

This rather small reddish-brown species has occurred at Wanganui, Napier and Wellington in the North Island, and at Blenheim, Christchurch, Dunedin and Invercargill in the South Island.

The expansion of the wings is about 1½ inches. The fore-wings are reddish-brown, slightly speckled with dull white except on a suffused central streak from the base to about two-thirds; an obscure, moderately broad white costal streak extends from the base to two-thirds; the orbicular is narrow oval, longitudinal, very finely margined with white and then with brown; the claviform is obsolete; the reniform is only indicated by two white dots, representing its lower angles; the transverse lines are very acutely dentate but hardly traceable.

According to Mr. Philpott, the larva of this insect closely resembles that of *M. parcausta*.

The perfect insect appears from October till December, and is attracted by sugar and light.

MELANCHRA OMOPLACA.

(*Mamestra omoplaca*, Meyr., Trans. N.Z. Inst., xix. 24; *Morrisonia omoplaca*, Hamps., Cat., v. 382, pl. lxxxix. 2; *Melanchra umbra*, Huds., Trans. N.Z. Inst., xxxv. 243, pl. xxx. 7-9.)

(Plate VIII., fig. 26, 27 ♂ varieties.)

This very variable species has occurred at Wellington, Lake Coleridge, Moeraki, Dunedin, Queenstown, Ida Valley and Invercargill, but is not generally common.

The expansion of the wings is about 1½ inches. The fore-wings of the male vary from pale-ochreous to dull reddish-ochreous or purplish-brown. The central portion of the wing is frequently more or less clouded with black, and there are often two black patches on the termen. The orbicular is oval, finely outlined in black; the reniform is large, black towards the base and pale towards the termen; the claviform is obscurely outlined in black; the transverse lines are usually very faintly indicated, except on the costa. The sides of the thorax are black and the central crest pale-brown. The hind-wings are dark brownish-grey. In the female the fore-wings are usually dull purplish-brown and the transverse lines distinct.

As already indicated there is a great variation, especially in the male.

The perfect insect appears from September till March, and is taken at sugar and blossoms.

MELANCHRA ALCYONE.

(*Melanchra alcyone*, Huds., N.Z. Moths, 24.)

(Plate VIII., fig. 25 ♀.)

This species has occurred at Wanganui and Wellington in the North Island, and at Christchurch, Dunedin, Queenstown and Invercargill in the South Island.

The expansion of the wings of the ♂ is 1½ inches, of the ♀ 1¼ inches. The fore-wings of the male are warm brown, darker towards the base; there is a wavy, white-edged, black, transverse line at about one-fifth, followed by a round black spot; the costa is yellowish, with four pairs of short oblique black marks; the orbicular is large, oval, oblique, pale yellowish-brown slightly darker in the middle; the claviform is small, obscure, and brownish-black; the reniform is black, outlined with dull white; there is a series of very acute, dull white, tooth-like terminal markings, and the termen itself is slightly scalloped; the cilia are dark brown. The hind-wings are grey with a series of small dark marks on the termen; the cilia are reddish-ochreous. The head and anterior portion of the thorax are reddish-ochreous; the rest of the thorax is rich brown, and there is a conspicuous black transverse line between the pale and dark colouring; the abdomen is reddish-ochreous with the crests reddish-brown. The female is darker and duller than the male, the markings are less distinct, there are several additional jagged transverse lines, and the white markings of the male are indistinctly indicated in drab.

This species may be distinguished from all the varieties of *M. omoplaca* by the strongly dentate subterminal line.

The perfect insect appears from August till May, but is very rarely met with.

MELANCHRA RUBESCENS.

(*Xylophasia rubescens*, Butl., Cist. Ent. ii. 489; *Morrisonia rubescens*, Hamps., Cat. v., 376, pl. lxxxviii. 28; *Melanchra rubescens*, Meyr., Trans. N.Z. Inst., xix. 25.)

(Plate IX., fig. 4 ♂; 5 ♀.)

This fine species has occurred on Mount Egmont and at Rangataua and Waiouru in the North Island. It is probably generally distributed throughout the South Island and has been found on Stewart Island.

The expansion of the wings ranges from 1½ to 1¾ inches. The fore-wings are pale orange-brown, the orbicular and claviform spots are faintly margined with reddish-brown; the reniform is dark brown and very conspicuous; there are two large reddish-brown markings on the termen. The hind-wings are grey tinged with red. The cilia of all the wings are reddish-brown.

This species varies in the shape and extent of the markings on the termen of the fore-wings, which occasionally cause the pale ground colour to form tooth-like projections. It also varies considerably in the intensity of the other markings, and in the depth of the ground colour. In the female there are often white patches on the costal and subterminal areas.

The perfect insect appears from October till March, and is attracted by sugar and light. It is usually found in open situations and often occurs at considerable elevations. It is very common on the Tableland of Mount Arthur, at an altitude of 3,500 feet above the sea-level.

MELANCHRA PASCOI.

(*Morrisonia pascoei*, Howes, Trans. N.Z. Inst., xlv. 205.)

(Plate IX., fig. 1, 2 ♂ varieties; 3 ♀.)

This very distinct species was discovered by Mr. Howes at Orepuki. It was also taken plentifully by Mr. M. O. Pasco at Queenstown, Lake Wakatipu, and has occurred at Flagstaff Hill, near Dunedin.

The expansion of the wings of the male is 1½ inches; of the female about 1¾ inches. The fore-wings of the male are bright reddish-brown with indistinct blackish markings; there is a very faint basal line; the first line is obscurely indicated; the subterminal line is marked by cloudy patches near veins 3 and 7 but hardly traceable towards the apex; the orbicular is elongate-oval, very faintly outlined in brown; the reniform very distinct, crescentic, bordered with dull ochreous towards the termen. The hind-wings are dark greyish-brown narrowly bordered with reddish-brown; the cilia of all the wings are reddish-brown. The female has the fore-wings pale ochreous, the markings are similar but much more distinct than in the male. On the underside in both sexes there is a well-marked blackish lunule in the disc of each wing and a well-defined curved line at about two-thirds passing across both wings from costa to dorsum.

A very distinct variety occurs in both sexes having a broad, cloudy longitudinal stripe on the fore-wings extending from the base to the tornus.

The perfect insect appears from August till December, and is taken at sugar.

This species has a considerable superficial resemblance to *Melanchra rubescens* from which it may be distinguished by its smaller size, shorter and somewhat broader wings, relatively larger crests and distinct markings on the under-surface.

Described and figured from specimens which were given to me by Mr. Pasco.

MELANCHRA LIGNANA.

(*Hadena lignana*, Walk., Cat., xi. 758; *Morrisonia lignana*, Hamps., Cat., v. 383, pl. lxxxix. 3; *Mamestra lignana*, Meyr., Trans. N.Z. Inst., xix. 26.)

(Plate VIII., fig. 21 ♂; Frontispiece, fig. 5 egg.)

This rather pale-looking species has occurred at Morere, Hawke's Bay, is very common at Wellington, and has also been found at Blenheim, Mount Hutt, Dunedin, and Paradise, Lake Wakatipu.

The expansion of the wings is 1½ inches. The fore-wings are greyish-cream-colour, slightly paler on the costa and darker towards the base and centre. There are two very distinct blackish transverse marks on the costa near the base, and two others at about one-third; the stigmata are all sharply and finely outlined in blackish-brown; the orbicular is oval, the claviform triangular, the reniform large and oblong, containing a smaller black-edged mark in its centre, and a blackish blotch towards its lower margin; the second line is faint and very jagged; there are two dark patches on the termen; the pale ground colour forming two sharp, tooth-like markings slightly below the middle; the termen itself is slightly indented, and the cilia are dark brown. The hind-wings are dark grey with the cilia white.

Some specimens of this insect are darker than others, but in other respects there are no important variations.

The perfect insect appears from October till April. It comes freely to sugar and to light, and is often taken at rest on trees and fences in the daytime. Specimens are occasionally met with in the early winter.

MELANCHRA STIPATA.

(*Xylina stipata*, Walk., Cat., xxxiii. 753; *Morrisonia stipata*, Hamps., Cat., v. 379; *Mamestra stipata*, Meyr., Trans. N.Z. Inst., xix. 25.)

(Plate VIII., fig. 35 ♂, 36 ♀.)

This fine species has occurred at Mount Egmont and Wellington in the North Island, and in the South Island at Christchurch, Moeraki, Dunedin, Lake Wakatipu, Orepuki and Invercargill. It also occurs on Stewart Island.

The expansion of the wings is 1¾ inches. The fore-wings are rich brown; there is a shaded, paler brown, longitudinal line on the costa, and an extensive irregular patch of the same colour from about two-thirds to within a short distance of the termen; the orbicular is large, oval, oblique, pale yellowish-brown; the claviform is semicircular, broadly margined with black; the reniform is dull grey, with one large and one or two small white marks towards the termen; the termen is broadly shaded with dark blackish-brown, except near the apex of the wing and a little below the middle. The hind-wings are dark brownish-grey, with the cilia reddish-brown. The female is paler with a slightly olive tinge. Both sexes vary a little in the depth of their colouring.

The perfect insect appears from September till May, and occasionally during the winter. It is freely attracted by blossoms or sugar. Although rather rare in Wellington it seems to be fairly common and generally distributed in the South Island.

MELANCHRA MEROPE.

(*Melanchra merope*, Huds., N.Z. Moths, 19; *Morrisonia chlorographa*, Hamps., Ann. Mag. Nat. Hist., 1905, 452. *Morrisonia merope*, ib., Cat. v. 612.)

(Plate X., fig. 24 ♂.)

This large and very striking insect has been taken at several localities near Wellington in the North Island, and at Waiho Gorge, Dunedin, Lake Wakatipu and Orepuki in the South Island, but is extremely irregular in its appearance.

The expansion of the wings is nearly two inches. The fore-wings are rich chocolate-brown, with greenish-yellow markings outlined in very deep brown; there is a rather broad, broken basal line; the reniform is large, finely outlined with brown towards the base of the wing and half-filled in with greenish-yellow towards the termen; the second line is very jagged and much interrupted; there is a subterminal series of dark brown-edged yellow spots and a terminal series of brown dots, the termen itself being strongly scalloped; the cilia are dark brown. The hind-wings are brown, tinged with pink; there is an obscure terminal line; the cilia are brownish-pink. The head and thorax are dark brown, the abdomen pale brown, with the crests darker.

The larva, according to Mr. Howes,* is slightly over 1½ inches in length, stout, dull olive green marked with black; there is a row of ochreous spots down the back and a series of lateral oblique lines and small dots; the spiracles are plainly indicated by black dots and the underside is pale ochreous. The foodplant is ribbon-wood (*Gaya Lyallii*).

The perfect insect appears from October till April, and is attracted by sugar and blossoms. It is, however, a very rare species.

MELANCHRA DOTATA.

(*Dasypolia dotata*, Walk., Cat. xi. 522; *Morrisonia dotata*, Hamps., Cat., v. 380, pl. lxxxviii. 31; *Mamestra dotata*, Meyr., Trans. N.Z. Inst., xix. 24.)

(Plate VIII., fig. 34 ♂.)

This very richly-coloured insect has occurred near Rangataua in the North Island. In the South Island it has been taken at Nelson, on Ben Lomond and the Lake Harris Track, near Lake Wakatipu, and at Orepuki.

The expansion of the wings is 1½ inches. The fore-wings are very dark brownish-black; there are several obscure black marks near the base; the orbicular is large, irregularly oblong, finely margined with black, the claviform is triangular, also finely margined with black, both orbicular and claviform are surrounded by a conspicuous black shading; the reniform is large ear-shaped, white towards the termen and dark brown towards the base of the wing, the white portion is traversed by a curved brownish line; there is a curved subterminal line, the

space immediately inside this being paler than the rest of the wing and a terminal series of obscure pale dots. The hind-wings are greyish-black, paler towards the base.

The perfect insect appears from October till April, but is very rarely met with. It has been found in sub-alpine forests at an elevation of about 3,000 feet above the sea-level.

MELANCHRA ASTEROPE.

(*Melanchra asterope*, Huds., N.Z. Moths, 24.)

(Plate viii., fig. 30 ♂.)

This species, which is closely allied to *Melanchra dotata*, has occurred on the Tableland of Mount Arthur, on Mount Richmond near Pelorus Sound, Bold Peak, and the Routeburn Valley, near Lake Wakatipu.

The expansion of the wings is 1½ inches. The fore-wings are dull brown with a pale area on the dorsum near the base, and a very broad pale subterminal band; there is a broken black-edged transverse line near the base, and a fainter transverse line at about one-third; the orbicular is oval, the claviform conical, and the reniform whitish, and very conspicuous; all are strongly outlined in black; there is a shaded transverse line on each side of the broad subterminal band; the termen is broadly-edged with dark brown; the cilia are brown, and the veins are marked in black. The hind-wings are pale grey; there is a rather conspicuous lunule and two shaded transverse lines; the cilia are grey.

The perfect insect appears in December and January, and is attracted by sugar and light. It seems to frequent mixed forest and open country, at altitudes ranging from 2,500 to about 4,000 feet above the sea-level.

MELANCHRA TARTAREA.

(*Graphiphora tartarea*, Butl., Proc. Zool. Soc. Lond., 1877, 384, pl. xlii. 2; *Mamestra tartarea*, Meyr., Trans. N.Z. Inst., xix. 21; *Morrisonia tartarea*, Hamps., Cat., v. 381, pl. lxxxix. 1.)

(Plate VIII., fig. 32 ♂, 33 variety.)

This very distinctly-marked species has occurred on the Murimutu Plains in the North Island, and at Christchurch, Dunedin and Invercargill in the South Island.

The expansion of the wings is 1½ inches. The fore-wings, which have the termen slightly scalloped, are very deep chocolate-brown with very pale brown markings; the transverse lines are fairly distinct, dark margined; the claviform is small, conical, dark brown margined with black; the orbicular and reniform are large outlined in pale brown, the anterior portion of the reniform being filled in with pale brown; there is a broad, pale brown terminal band and a narrow streak of pale brown along the dorsum. The hind-wings are grey with the cilia pale brown.

A variety occurs in which the central area of the fore-wings is more or less clouded with reddish-brown, with dark brown patches around and below the reniform, and in this form the pale brown terminal band is much less conspicuous than usual.

The egg is about three hundredths of an inch in diameter, round, bright green, somewhat flattened underneath; the micropyle is distinct; there is a series of ribs meeting at the micropyle, each alternate rib being shorter than the others; between each of the ribs there are numbers of very fine flutings.

*Trans. N.Z. Inst., xlv. 97.

The newly emerged larva is about one-twelfth of an inch in length; the head is very large, pale brown, darker on the sides; the body is slender, dull whitish-ochreous with two rows of large black warts on each segment, each wart emitting a long black bristle; the two anterior pairs of ventral prolegs are small and are not regularly used in walking. The larva is active in habit and devours the egg-shell.

The perfect insect appears from December till May, and is attracted by sugar and light. It is a rare species in the north, but generally distributed in the far south.

MELANCHRA AGORASTIS.

(*Melanchra agorastis*, Meyr., Trans. N.Z. Inst., xix. 18; *Morristonia agorastis*, Hamps., Cat. v. 371, pl. lxxxviii. 23.)

(Plate VIII., fig. 31 ♂.)

This rather bright-looking species has occurred at Waiouru and Wellington in the North Island, and at Akaroa, Lake Guyon, Dunedin, Lake Wakatipu, Routeburn Valley and Invercargill in the South Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. *The fore-wings are rich reddish-brown and very glossy with dull yellowish-white markings more or less speckled with grey, especially in the male; the transverse lines are distinct, darker brown, edged with greyish, the subterminal line being edged outwardly with yellowish-white; the claviform is small, grey, margined with dark reddish-brown; the orbicular is also rather small, grey, margined with dull white; the reniform is rather large, oblong, dark grey, margined rather broadly with yellowish-white. The hind-wings are dark brown. The antennae of the male are very shortly pectinated.*

The perfect insect appears from December till April, and is usually taken at sugar. It seems to inhabit open country at elevations between 1,000 and 2,500 feet above the sea-level. It is a rare insect in most localities, although fairly common at Queenstown, Lake Wakatipu.

MELANCHRA FENWICKI.

(*Melanchra fenwicki*, Philp., Trans. N.Z. Inst., liii. 337.)

(Plate XLIX., fig. 17 ♂.)

This richly-coloured species was discovered by Mr. Fenwick at Dunedin.

The expansion of the wings is almost $1\frac{1}{2}$ inches. *The antennae are strongly bipectinated from base to near apex. The fore-wings are deep brownish-red; there is a short, ill-defined, dark brown basal streak margined above with a few whitish scales; a whitish dot above this; the stigmata are very distinct, finely margined first with dull white then with deep brown; the claviform is incomplete, almost round; the orbicular large, round; the reniform kidney-shaped; large; there is a subterminal series of deep brown marks margined with pale ochreous towards the termen, especially near the tornus; the termen is slightly waved; the cilia are brownish-red. The hind-wings and cilia are pale brown.*

Closely allied to *M. agorastis* from which it differs in the larger orbicular, and longer antennal pectinations.

The perfect insect appears in September.

Described and figured from the specimen in Mr. Fenwick's collection.

MELANCHRA VITOSA.

(*Apamea vitosa*, Butl., Proc. Zool. Soc. Lond., 1877, 384, pl. xlii. 3; *Mamestra proteastis*, Meyr., Trans. N.Z. Inst., xx. 45; Huds., N.Z. Moths, 20, pl. iv. 40.)

(Plate IX., fig. 13 ♂.)

This very richly-coloured species has occurred at Thames, Ohakune and Wellington in the North Island. In the South Island it is generally distributed throughout Otago.

The expansion of the wings is about $1\frac{1}{2}$ inches. *The fore-wings are very dark chocolate brown, often reddish-tinged; the markings are darker; the basal and first lines are obscure, much interrupted; the orbicular is round, sometimes slightly paler margined; the claviform is oval, both are outlined in dark brown and are often very indistinct; the reniform is rather small oval, white, or pale yellowish-brown, with a very distinct minute dot above and below it; the second line is finely toothed and strongly bent inwards below the reniform; the subterminal line is very wavy, much interrupted, paler, broadly margined with dark brown, with two rather strong dentations below the middle. The hind-wings are greyish-brown, with the cilia tinged with reddish-brown.*

The perfect insect appears very irregularly throughout the year, but is rarely met with.

MELANCHRA OCHTHISTIS.

(*Melanchra ochthistis*, Meyr., Trans. N.Z. Inst., xix. 20; *Morristonia ochthistis*, Hamps., Cat. v. 380, pl. lxxxviii. 32; *Melanchra vitosa*, Huds., N.Z. Moths, 20, pl. iv. 42.)

(Plate IX., fig. 14 ♀.)

This very obscurely marked species has occurred in the Wellington district and at Christchurch. It is generally distributed throughout Otago, and is found on Stewart Island.

The expansion of the wings varies from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. *The fore-wings are deep chocolate-brown, slightly paler between the second and subterminal lines; the basal and first transverse lines are margined with very dark brown; the claviform is irregularly conical, also dark margined; the reniform is elongate, ear-shaped, margined with dark brown towards the base and with dull whitish towards the termen, the whitish portion being sometimes broken up into one or two dots; the subterminal line is paler, fine and wavy, sometimes irregularly dark-margined. The hind-wings are brownish-grey, paler towards the base.*

The larva, which feeds on *Carpodetus serratus* and *Rubus australis* during the spring and early summer, is rather robust, very pale whitish-green above with numerous white lines and dots; darker green beneath with yellow dots. In the light part there is a triangle of black spots on each segment. The young larva has a strong pink lateral line, but in mature specimens this line is confined to the anterior and posterior segments. The length of the full-grown larva is about $1\frac{1}{4}$ inches.

The pupa is enclosed in a light cocoon on the surface of the ground.

The perfect insect appears from November until April or May. It is occasionally taken at sugar.

MELANCHRA MOROSA.

(*Xylophasia morosa*, Butl., Cist. Ent., ii. 543; *Morrisonia morosa*, Hamps., Cat., v. 384, pl. lxxxix. 4; *Mamestra pelistis*, Meyr., Trans. N.Z. Inst., xix. 20; Huds., N.Z. Moths, 19, pl. v. 3, 4.)

(Plate VIII., fig. 22 ♂.)

This species has occurred at Auckland, the King Country, Paekakariki and Wellington in the North Island. In the South Island it has been found at Akaroa and Lake Coleridge, and is generally distributed throughout Otago.

The expansion of the wings is about 1½ inches. The fore-wings are pale brownish-ochreous more or less shaded with dark reddish-brown, especially in the vicinity of the transverse lines and stigmata; the orbicular is grey, margined with pale ochreous; the claviform is small, round, dull grey edged with darker; the reniform is large, darker grey, its lateral margins edged first with pale ochreous and then with dark brown; the transverse lines are distinct; the veins are dotted with grey; the subterminal line is pale ochreous distinctly toothed before the tornus. The hind-wings are dark grey.

There is considerable variation in the ground colour of the fore-wings. In some specimens the wing is almost entirely rich reddish-brown, whilst in others this colour is confined to the neighbourhood of the stigmata and transverse lines. Numerous intermediate varieties occur which completely connect these two forms. It is also noticeable that specimens from the extreme south are somewhat darker and duller than those captured in the North Island.

The perfect insect appears from January till June. It is attracted by sugar and blossoms, and has been found on mountains at elevations of about 3,000 feet. It is very common in the Wellington Botanical Gardens on the white rata blossoms. Mr. Philpott states that specimens taken at Broad Bay, Otago Peninsula, are without any pink tinge, and have the hind-wings of a very dark fuscous. Dark examples of this species are difficult to separate from *agorastis*, but the latter is somewhat shorter-winged and has a broad blunt anterior thoracic crest in place of the pronounced bifid one of *morosa*.*

MELANCHRA LEVIS.

(*Melanchra levis*, Philp., Trans. N.Z. Inst., xxxvii. 329, pl. xx. 4.)

(Plate VIII., fig. 28 ♂; Plate XLVIII., fig. 18 variety.)

This very distinct, but obscurely-marked little species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also occurred at Moeraki, Dunedin, and at Lake Wakatipu.

The expansion of the wings is about 1½ inches. The fore-wings are rather broad, with the termen strongly bent inwards immediately before the tornus; brown faintly tinged with dull green; the markings are indistinct, blackish; there are two very faint double transverse lines on the basal third; the orbicular and basal half of the reniform are finely outlined in black, the outer half of the reniform being dull yellowish-white; there is a very distinct, slightly waved, subterminal line, finely edged with dull green towards the termen; the cilia are pale greenish,

irregularly barred with brown. The hind-wings are greyish-brown darker towards the termen.

The perfect insect appears from September till February, and is occasionally taken at sugar. A remarkable variety of the male, kindly lent to me by Mr. Clarke, is figured on Plate XLVIII., fig. 18.

MELANCHRA LITHIAS.

(*Mamestra lithias*, Meyr., Trans. N.Z. Inst., xix. 17; *Morrisonia lithias*, Hamps., Cat., v. 378.)

(Plate IX., fig. 24 ♀.)

This rather small species has occurred at Castle Hill, Wedderburn, Mount Ida, Lake Wakatipu, Vanguard Peak, and Hunter Mountains, at elevations of about 3,000 feet above the sea-level. It has also been taken at Lumsden Nevis, and Commissioner's Creek.

The expansion of the wings is 1½ inches. The fore-wings are greyish-brown, with the transverse lines and stigmata whitish, irregularly edged with black; the claviform is minute, round and very distinct; the orbicular rather small, oval, oblique, black-edged, except towards the costa; the reniform is large, oblong, white, margined with black towards the base and termen and crossed by two grey lines; the subterminal line has two blunt teeth and there is a terminal series of blackish dots; the cilia are brownish-grey, narrowly barred with white. The hind-wings are grey, paler towards the base; the cilia are grey tipped with white.

The perfect insect appears in December and January, and is attracted by sugar. It is evidently a local species.

I am indebted to Mr. J. H. Lewis for my specimens.

MELANCHRA HOMOSCIA.

(*Mamestra homoscia*, Meyr., Trans. N.Z. Inst., xix. 21; *Morrisonia homoscia*, Hamps., Cat., v. 378, pl. lxxxviii. 30; *Hyssia sminthistis*, Hamps., Cat. v., 280, pl. lxxxvii. 17.)

(Plate IX., fig. 23 ♀; Plate I., fig. 18 larva.)

This very dull-looking species has occurred commonly at Wellington. It has also been found at Blenheim, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is about 1½ inches. The fore-wings are uniform dark grey; the veins are marked with a series of white dots, preceded and followed by black marks; the orbicular, reniform, and claviform spots are scarcely visible; there is an indistinct wavy subterminal line. The hind-wings are grey; the cilia are white with a cloudy line. The head, thorax, and abdomen are grey. Varies somewhat in the depth of the dull grey ground colour.

The larva, which feeds on the Tauhinu (*Cassina leptophylla*) during the spring and early summer, is about 1½ inches in length, rather slender, grey, darker on the back with the whole surface mottled and speckled with darker grey; the back of the second segment is blackish with three yellow stripes; there is an obscure dorsal line; a series of very conspicuous white sub-dorsal spots, situated in a blackish sub-dorsal line; a broad wavy pale grey lateral line; the spiracles are pink; the legs and prolegs are brownish-ochreous; there are a few isolated short black bristles. This larva is extremely inconspicuous when

*Trans. N.Z. Inst., xlix., 200.

amongst the foliage of its foodplant, the resemblance of the young caterpillar to a small dead, or half dead, shoot being most remarkable.

The pupa is concealed in the earth.

The perfect insect appears from September till April or May. It is freely attracted by sugar, blossoms and light.

MELANCHRA TEMPERATA.

(*Bryophila temperata*, Walk., Cat. xv., 1648; *Xylina inceptura*, ib. 1736; *X. deceptura*, ib. 1737; *Morrisonia temperata*, Hamps., v. 385, pl. lxxxix. 6.)

(Plate X., fig. 28 ♂.)

The fore-wings are grey-brown with a reddish tinge and some fuscous irroration, the veins streaked with fuscous; sub-basal line represented by double dark striae from costa and cell; antemedial line represented by double dark points on costa, median nervure and vein 1; claviform sometimes partly defined by fuscous; orbicular and reniform with slight whitish annuli defined by fuscous, the former rather elongate elliptical, the latter somewhat angled inwards on median nervure; postmedial line more or less indistinct, dentate, and with a series of points beyond it on the veins, bent outwards below costa and oblique below vein 4; subterminal line represented by some more or less indistinct dentate dark marks at middle; a terminal series of dark points. The hind-wings are fuscous-brown; the cilia pale at tips; the underside pale with slight discoidal lunule and curved postmedial line. The female is greyer than the male.

I am unacquainted with this species. The above particulars have been taken from the description given by Sir George Hampson in volume v. of the "Catalogue of the Lepidoptera Phalaenae" in the British Museum, and the figure has been copied from the same publication.

MELANCHRA PRIONISTIS.

(*Mamestra prionistis*, Meyr., Trans. N.Z. Inst., xix. 27; *Morrisonia prionistis*, Hamps., Cat. v. 384, pl. lxxxix. 5.)

(Plate IX., fig. 22 ♀.)

This species is common at Wellington in the North Island, and seems to be generally distributed throughout the South Island.

The expansion of the wings of the male is $1\frac{1}{2}$ inches, of the female $1\frac{1}{4}$ inches. The fore-wings are rather pale yellowish-brown, with numerous irregular longitudinal grey streaks; there are several very obscure jagged transverse lines, and the stigmata are almost invisible; a very broad blackish longitudinal band is situated on the dorsum. The hind-wings are brownish-grey; the cilia are grey tipped with white. The head and thorax are grey tinged with yellowish-brown; there is a conspicuous blackish streak on each side of the thorax.

In this species the dorsal band is often considerably paler, but otherwise there is no variation.

The perfect insect appears from September till May. It comes freely to sugar, and occasionally to light. It is also sometimes found at rest on trees in the daytime, where its colouring is protective. I have noticed that this moth is much commoner in some years than in others. Specimens are occasionally met with during the winter.

MELANCHRA SEQUENS.

(*Morrisonia sequens*, Howes, Trans. N.Z. Inst., xlv. 204; Butterfly Hunting in Many Lands, pl. vi. 1.)

(Plate IX., fig. 26 ♂.)

This clearly-marked species was discovered by Dr. G. B. Longstaff at Whakarewarewa, near Rotorua. It has also been taken at Taihape.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are rather narrow, pale bluish-grey faintly mottled with pale greyish-brown; the orbicular is oval, distinct, outlined in brownish-black; the reniform large, also distinct; there is a short broken, brown bar below these two markings; an oblique sub-apical shading; the veins are faintly indicated by broken blackish marks and there is a series of costal bars and terminal dots; the other markings are indefinite. The hind-wings are dark greyish-brown, darker towards the termen.

The perfect insect appears in February.

MELANCHRA PHRICIAS.

(*Mamestra temperata*, Meyr., Trans. N.Z. Inst., xix. 27; (nec Walk.); *Mamestra phricias*, Meyr., ib. xx. 46; Hamps., Cat. v. 385, pl. lxxxix. 7.)

(Plate IX., fig. 11 ♀.)

This species has occurred at Rangataua and in the Manawatu district in the North Island. In the South Island it has been found at Blenheim, Christchurch, Lake Coleridge, Central Otago, and Lake Wakatipu.

The expansion of the wings is about $1\frac{1}{2}$ inches. Very like *M. sequens*, but with all the markings much less distinct, the hind-wings paler and greyer, and the palpi very much longer and more slender than in that species.

A variety occurs in which the dorsum is strongly margined with black.

The perfect insect appears from October till May, and is attracted by sugar and light. It is not a common species.

MELANCHRA CHRYSERYTHRA.

(*Morrisonia chryserythra*, Hamps., Ann., Mag. Nat. Hist., [7], xv., 452, [1905].)

(Plate IX., fig. 6 ♂, 7 ♀.)

This very bright-looking species has occurred at Gore and Orepuki, Southland, and on Bold Peak and in the Routeburn Valley, near Lake Wakatipu.

The expansion of the wings of the male is almost $1\frac{1}{2}$ inches, of the female $1\frac{1}{4}$ inches. The antennae of the male are moderately bi-pectinated from base to near apex. The fore-wings of the male are bright brownish-red, darker between the first and second lines; the orbicular is darker finely, but irregularly outlined in white; the reniform large, kidney-shaped, paler in the middle, broadly but irregularly outlined in white below, finely outlined in white above; the second line is distinct and jagged; beyond this the veins are obscurely marked with blackish and dull white dots; there is a series of faint sub-terminal marks. The hind-wings are pale reddish-ochreous. In the female the fore-wings are bright ochreous-brown, very slightly tinged with purplish; the basal line is indicated by three brown marks; the first line is distinct, wavy, extending from $\frac{1}{4}$ of costa to near the middle of the dorsum; the claviform is indicated by a minute

brown dot; the reniform and orbicular are large and distinct, outlined first with ochreous, and then interruptedly with dark brown; the second line is very distinct, strongly dentate, curved, from $\frac{1}{4}$ of the costa to $\frac{1}{4}$ of the dorsum; there is a subterminal series of minute V-shaped brown marks and the veins are clearly marked in grey, especially towards the termen. The hind-wings are pale brownish-ochreous with two faint shaded transverse lines.

The perfect insect appears in December and frequents forest. It is a very rare species.

Described and figured from specimens kindly lent to me by Mr. C. E. Clarke.

MELANCHRA DISTRACTA.

(*Melanchra distracta*, Meyr., Trans. N.Z. Inst., iv., 202.)

This very obscure species has been taken at Whakapapa, Mount Ruapehu, at an elevation of about 4,000 feet above sea level.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are "grey suffusedly irrorated white; veins marked with interrupted blackish lines; first and second lines double, waved-dentate, blackish-grey, rather curved, second very strongly near costa; median shade rather curved, grey, on costa forming an oblique blackish streak; orbicular little marked, large, round, grey-whitish centred with grey suffusion, reniform trapezoidal, white, interior filled with whitish-grey, anterior edge sub-convex, posterior concave; subterminal line indicated by an inwards-oblique streak of dark fuscous suffusion from costa towards apex and a similar somewhat interrupted streak from termen beneath apex to dorsum before tornus, terminal area round these suffused whitish; black terminal interneural dots or marks; cilia grey slightly sprinkled white. Hind-wings light fuscous, posterior half suffused rather dark grey; cilia fuscous tips whitish mixed."

I am unable to point out any clear distinctive characters by which this species can be distinguished.

The perfect insect appears in January.

Sub-family 4.—CARADRINIDÆ.

Eyes glabrous without marginal cilia; tibiae not spinose.

Genus 16.—BITYLA, Walk.

Face without prominence. Antennae in male ciliated. Thorax clothed with hair without crests. Abdomen without crests.

This genus, which is apparently endemic, contains three species.

BITYLA DEFIGURATA.

(*Xylina defigurata*, Walk., Cat., xxxiii. 756. *Bityla thoracica*, ib. 869. *Bityla defigurata*, Meyr., Trans. N.Z. Inst. xix. 31.)

(Plate X., fig. 12 ♀.)

This very dull-looking insect seems to be generally distributed throughout both North and South Islands although nowhere very abundant.

The expansion of the wings is slightly over $1\frac{1}{2}$ inches. The fore-wings are uniform dull brassy-brown and very glossy; the first and second lines are faintly indicated by dark marks. The hind-wings are dark grey, also glossy.

The perfect insect appears from September till May, and is attracted by sugar and light.

Worn hibernating specimens may frequently be found during the winter, under loose flakes of bark, or in crevices of trees.

BITYLA SERICEA.

(*Bityla sericea*, Butl., Proc. Zool. Soc. Lond. 1877, 387, pl. xlii. 12; Meyr., Trans. N.Z. Inst. xix. 31.)

(Plate X., fig. 11 ♂.)

This rather striking insect has occurred at Thames and Wellington in the North Island, and at Christchurch, Lake Guyon and Queenstown, Lake Wakatipu, in the South Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. *The fore-wings are very dark greyish-black, darker near the termen, and very glossy; there are several isolated white scales towards the base of the wing, and a very obscure transverse line at about three-fourths; the cilia are cream colour and very conspicuous. The hind-wings are dark grey and glossy; the cilia are pale grey, very broadly tipped with cream colour.*

The perfect insect appears from February till May, and is attracted by light. It is a rather scarce species.

BITYLA PALLIDA.

(*Orthosia pallida*, Huds., Trans. N.Z. Inst., xxxvii. 355; *Bityla pallida*, Hamps., Cat., vii. 42, pl. cix. 6.)

(Plate X., fig. 10 ♂.)

This species was discovered by Mr. H. W. Simmonds near Napier.

The expansion of the wings is nearly $1\frac{1}{2}$ inches. *The fore-wings are pale cream-colour; there are three very obscure, wavy, grey transverse lines; one near the base, another at about $\frac{1}{4}$ and a third at about $\frac{3}{4}$; the central area is slightly clouded with brown and the reniform indicated by a brownish mark. The hind-wings are almost white slightly shaded with grey near the termen. The head and thorax are cream-colour and the abdomen whitish-ochreous.*

The perfect insect appears in April.

Genus 17.—ARIATHISA, Walk.

Face without prominence. Antennae in male ciliated. Thorax clothed chiefly with scales, with small posterior double crest. Abdomen without crests.

A rather extensive characteristically Australian genus. The single New Zealand species is apparently endemic, but extremely close to Australian forms.

ARIATHISA COMMA.

(*Manestra comma*, Walk., Cat., ix. 239; Butl., Voy. Erebb., pl. ix. 6. *Graphiphora implexa*, Walk., Cat., x. 405. *Hadena plusiata*, ib., xxxiii. 742; *Nitocris bicomma*, Gu., Ent. Mon. Mag. v., 4. *Orthosia comma*, Meyr., Trans. N.Z. Inst. xix. 30.)

(Plate X., fig. 19 ♂; 20 ♀.)

This species is common and generally distributed throughout the country, and occurs on Stewart Island and in the Chatham Islands.

The expansion of the wings is about 1½ inches. The fore-wings are dark grey; the transverse lines are distinct wavy, margined, with black; there is a black subterminal band, widest and most distinct near the costa; the orbicular spot is very minute and dull white; the reniform, which is surrounded by a black shading, is large, dull yellowish towards the costa, and white towards the termen. The hind-wings are dark grey. The females are generally much darker than the males, some specimens having the fore-wings very dark brownish-black.

Both sexes vary a good deal in the depth of colouring, but the markings appear to be quite constant.

The larva, which feeds on low plants, is dark brown, tinged with pink; the subdorsal region is paler, there is a series of diagonal blackish stripes on each segment, and the anterior portions of the larva are much darker than the rest of the body. It is full grown about January. The pupa state is spent in the earth.

The perfect insect appears from November till March. It is very common at the flowers of the white rata, and may also be attracted by sugar and by light.

Genus 18.—SPODOPTERA, Guen.

Face without prominence, antennae in male ciliated. Thorax clothed chiefly with scales, with posterior spreading crest. Abdomen with dorsal crest at base.

A small widely distributed genus, of which two species have a very extensive range, one of which reaches New Zealand.

SPODOPTERA MAURITIA.

(*Spodoptera mauritia*, Boisd., Faun. Ent. Madag. Lép., 92, pl. xiii. 9; Hamps., Cat., viii. 256; *Orthosia margarita*, Hawth., Trans. N.Z. Inst., xxix. 283; Huds., N.Z. Moths, 6.)

(Plate X., fig. 21 ♂.)

This species was taken in Wellington by Mr. E. F. Hawthorne thirty years ago, but does not appear to have been met with since. It is evidently a very rare insect in New Zealand.

The expansion of the wings is about 1½ inches. The fore-wings are pale dull brown and rather glossy; there are several obscure dark marks near the base; the orbicular is oval, oblique, brownish-yellow, slightly darker in the middle; the claviform is almost obsolete; the reniform is rather large, bordered with dull white towards the base and termen; the second line is distinct wavy, edged with black; the subterminal line is whitish with several black wedge-shaped markings on its inner edge. The hind-wings are shining white and iridescent, with the veins black and the costa and termen narrowly shaded with black.

Superficially somewhat similar to *Euzoa radians* but immediately distinguished from that species by the absence of antennal pectinations in the male.

The larva feeds on rice and perhaps other cereals.

The perfect insect appears in April. This species is common throughout South Asia, Africa, Australia and the Pacific Islands.

Genus 19.—COSMODES, Guen.

Face without prominence. Antennae in male ciliated. Thorax clothed chiefly with scales, with anterior and posterior

crests. Abdomen with dorsal crests towards base and large crest on third segment. Fore-wings with scale tooth at tornus, termen angulated on vein 3.

The single species occurs apparently naturally in both Australia and New Zealand, but probably the former country is its home. It approaches the Asiatic *Canna*.

COSMODES ELEGANS.

(*Phalaena elegans*, Don, Ins. New Holl., pl. xxxvi. 5; *Cosmodes elegans*, Gn., Noct. vi. 290; Meyr., Trans. N.Z. Inst. xix. 35.)

(Plate X., fig. 17 ♀.)

This beautiful species is generally distributed throughout the North Island. In the South Island it has been taken at Nelson, Christchurch, and Governor's Bay.

The expansion of the wings is 1½ inches. The fore-wings are rich chocolate-brown, with four large pale green spots margined with silver; there is a curved silvery mark near the apex. The hind-wings are cream-coloured, shaded pinkish-brown towards the termen.

The larva feeds on *Lobelia*.

The perfect insect appears in March and April.

This species is found commonly in Eastern Australia.

Sub-family 5.—HYPENIDES.

Vein 8 of hind-wings shortly anastomosing with cell near base, thence diverging, vein 5 well developed nearly parallel to 4.

Genus 20.—HYPENODES, Guen.

Head with frontal tuft. Antennae in male ciliated. Palpi very long, porrected, second joint thickened with rough projecting scales, terminal rather short or moderately long, cylindrical. Thorax with appressed scales. Abdomen with small crest on basal segment. Tibiae smooth-scaled. Fore-wings with vein 7 separate, 9 and 10 out of 8.

There are two species in New Zealand.

HYPENODES COSTISTRIGALIS.

(*Hypenodes costistrigalis*, Steph., Ill. Brit. Ent., iv. 20; *Hypenodes exsularis*, Meyr., Trans. N.Z. Inst., xx. 46; *Scoparia triangulalis*, Huds., Ent. Mo. Mag. lix. 64.)

(Plate X., fig. 9 ♂.)

This rather inconspicuous little insect has occurred in the North Island at Kaeo, Taranaki, and Paekakariki. In the South Island it has been found in the Buller Gorge and at Invercargill.

The expansion of the wings of the male is about 1 inch; of the female ¾ inch. The fore-wings of the male, which have the apex rather blunt and the termen slightly convex, are pale brown or pale yellowish-white; there is a large, somewhat triangular darker brown patch on the outer portion of the costa and a cloudy suffusion on the termen, leaving a distinctly paler apical patch; the other portions of the wing are very thinly sprinkled with darker brown and there is a terminal series of black dots, sometimes elongated into a series of triangles. The hind-wings are ochreous-grey. In the female the fore-wings are very dull greyish-ochreous; a paler spot and two blackish marks are situated in the disc, and the costal and terminal areas are slightly clouded with dull brownish-grey; there is a very indis-

tinct series of whitish marks on the second line, and a terminal series of black dots. The hind-wings are grey.

The larva is stated to be purplish-brown with paler dorsal and subdorsal lines, the latter being blackish-edged beneath; the sides are more ochreous. It feeds on flowers of thyme, in cultivated places, its natural foodplant being unknown.*

The perfect insect appears in March, and may be taken at sugar on the outskirts of forest. It is a very local insect in this country. Elsewhere it is widely distributed, being found in the Kermadec Islands and throughout Europe, Asia and Australia.

HYPENODES ANTICLINA.

(*Hypenodes anticlina*, Meyr., Trans. Ent. Soc. Lond., 1901, 566; *Rhapha octius*, Huds., N.Z. Moths, 37, pl. vi. 7.)

(Plate X., fig. 16 ♀.)

This interesting little species has occurred in the North Island at Waimarino, Erua, Ohakune, Taihape, and in the neighbourhood of Wellington. In the South Island it has occurred at Nelson.

The expansion of the wings is about 1 inch. The fore-wings which have the costa straight, and the termen with a large, rounded projection slightly above the middle are pale brown; there is a small dark brown patch on the costa at the base, the first line is distinct, very strongly waved; a very broad, oblique, blackish-brown, oblong patch is situated on the costa at about one-third; the reniform is very large, indented towards the termen, where it is outlined in dark brown; there is a very fine jagged transverse line from beneath the reniform to the dorsum; a large irregular patch of dark brownish-black just before the apex, an obscure subterminal line and a series of minute, dark brown terminal marks. The hind-wings are dull whitish-grey; there is a faint blackish discal dot, a wavy line a little below the middle, and a terminal series of small dark marks. The antennae are filiform in both sexes.

The perfect insect appears in October, November and December. It frequents dense forest ravines, and is generally disturbed from amongst dead leaves or old fern fronds. It is usually a scarce species, but appears to be much commoner in some years than in others.

Genus 21.—CATADA, Walk.

Antennae in ♂ ciliated. Palpi very long, curved, ascending, second joint thickened with rough projecting scales, terminal joint long, with loosely appressed scales, pointed. Thorax and abdomen without crests. Tibiae smooth-scaled. Neuration normal (5 of hind-wings parallel).

An Indo-Malayan genus of some extent, of which one species has occurred in New Zealand.

CATADA LIGNICOLARIA.

(*Hemerophila lignicolaria*, Walk., Cat. xxxv., 1579; *Catada impropria*, Meyr., (nec Walk.) Trans. N.Z. Inst., xlix. 246.)

(Plate X., fig. 18 ♀.)

A few specimens of this very distinct species were captured, by Mr. E. C. Sherlock, at Thames about the

year 1904. It was rediscovered in January, 1925, by Colonel Tait, at Tutukaka, Whangarei, and has been taken in the same locality by Mr. E. S. West. It has also occurred at Waiuku, and at Leigh, near Auckland.

The expansion of the wings is 1½ inches. All the wings are dull pinkish-ochreous, with the margins strongly scalloped; there are numerous interrupted faint, wavy, oblique, blackish transverse lines, those bordering the basal patch median band and subterminal area being the most distinct; there is a blackish blotch on the fore-wings beyond and below the disc; two blotches on the dorsum of the hind-wings and a row of terminal black dots on all the wings.

The perfect insect appears from November till January. It is very retiring in its habits, resting in the darkest place with outspread wings. Dr. Turner, who kindly identified a New Zealand specimen forwarded to him by Mr. Philpott, states that the species is at present known only from Tasmania, where it appears to be generally distributed.

Sub-family 6.—CATOCALIDÆ.

Vein 8 of hind-wings shortly anastomosing with cell near base, thence diverging, vein 5 well developed; veins 3, 4 and 5 approximated at base; middle and sometimes posterior tibiae spinose.

Genus 22.—OPHIUSA, Ochs.

Antennae in male ciliated. Palpi moderately long, ascending, second joint thickened with dense appressed scales, terminal joint moderate, somewhat pointed. Thorax clothed with scales and hair, without crest. Abdomen without crest.

An extensive genus of general distribution, but principally tropical. Two species have occurred in New Zealand.

OPHIUSA MELICERTE.

(*Ophiusa melicerte*, Drury, Ill. Exot. Ins., 1, 46, pl. xxlii. 1; *Catocala traversii*, Fer., Trans. N.Z. Inst., ix. 457, pl. xvii; *Achaea melicerte*, Meyr., ib. xix. 37.)

(Plate X., fig. 8 ♀.)

This large and conspicuous Australian species has occurred in New Zealand at various times, its appearance being apparently independent of artificial introduction. It has been found near Whangarei, at Titahi Bay on the northern shore of Cook Strait, at Wellington, and at Nelson.

The expansion of the wings is 2½ inches. The fore-wings are pale yellowish-brown; the first line is fine, darker brown, slightly outwards-curved; the second line very strongly outwards-curved, irregularly shaded with brown towards the base; there is a subterminal rusty-yellow band, broadest towards the apex; a narrow, dark brown terminal band and a series of blackish terminal dots. The hind-wings are blackish-brown, paler towards the base; there is a broad white band near the middle, faintly tinged with lilac and three large white blotches on the termen.

The perfect insect appears about February.

It is widely distributed in Asia, Africa and Australia.

*Meyrick, Handbook of British Lepidoptera.

OPIHUSA PULCHERRIMA.

(*Grammodes pulcherrima*, Lucas, Proc. Linn. Soc. N.S.W., 1892, 258; Huds., Trans. N.Z. Inst. xxxvii., 355, pl. xxii. 4.)

(Plate XLIV., fig. 30 ♀.)

A single specimen of this well-known Australian species was captured by Mr. Creagh O'Connor at Titahi Bay, near Wellington, in March, 1904.

The expansion of the wings is 1½ inches. *All the wings are dark blackish-brown with white markings.* The fore-wings have an oblique transverse band from about $\frac{1}{4}$ on the costa to about $\frac{1}{2}$ on the dorsum; another band, very slender and curved near the dorsum, from a little more than $\frac{1}{4}$ on costa to about $\frac{1}{2}$ on dorsum. *There is a conspicuous black spot, partially ringed with pale-yellow, near the tornus, a small oblique white mark a little before the apex, and a fine oblique shaded line from the termen below the apex ending just before the black spot.* The hind-wings have a very broad curved white band near the base, several spots on the termen, and a blackish blotch in the middle of the termen. The cilia of the fore-wings are grey; of the hind-wings white, except near the black blotch, where they are black. The head and thorax are dark-grey, the abdomen pale-grey. The underside is much paler, with the white markings much broader than on the upper surface.

As this species has only occurred once in New Zealand it must at present be regarded as an accidental introduction.

Genus 23.—MOCIS, Hübner.

Proboscis fully developed; palpi upturned, the second joint reaching about to vertex of head and moderately scaled, the third typically moderate, oblique; frons smooth; eyes, large, round; antennae of male typically ciliated; thorax clothed almost entirely with scales and without crests; tibiae of male typically fringed with long hair, the fore tibiae not spined, the hind tibiae spined; build slender; abdomen smoothly scaled and without crests. Fore-wing with the apex somewhat produced, the termen evenly curved and slightly crenulate; veins 3 and 5 from near angle of cell; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole; 11 from cell. Hind-wing with the cell one-half length of wing; veins 3, 4 from angle; 5 fully developed from just above angle; 6, 7 from upper angle; 8 anastomosing with the cell near base only.

Represented by one species widely distributed in Australia and New Guinea.

MOCIS ALTERNA.

(*Mocis alterna*, Walk., Cat., XV., 1833.)

(Plate X., fig. 26 ♀.)

This common Australian species was captured, by Mr. Philpott, at Nelson.

The expansion of the wings is 1½ inches. *All the wings are pale brown.* The fore-wings have faint lilac reflections on the costal region; the markings are blackish-brown; a conspicuous oblique transverse line from about $\frac{1}{4}$ of costa to before middle of dorsum; a minute black spot near dorsum before this; orbicular stigma ear-shaped, outlined in dusky brown reniform large, dark brown, subquadrate, with wedge-shaped indentation towards termen; an almost straight transverse line from before apex to near tornus, much attenuated in the middle; the terminal area is slightly clouded with blackish-brown. The hind-wings have a wavy blackish transverse line from middle of

costa to $\frac{3}{4}$ of dorsum, followed by a very pale band; the sub-terminal and terminal areas are irregularly suffused with blackish-brown.

The perfect insect occurred towards the end of February, and was attracted by light.

Described and figured from the specimen submitted by Mr. Philpott.

Sub-family 7.—PLUSIADES.

Vein 8 of hind-wings shortly anastomosing with cell near base, thence diverging, vein 5 well developed; veins 3, 4 and 5 approximated at base; tibia not spinose. (Plate C., figs. 12, 14-18.)

Genus 24.—PLUSIA, Ochs.

Antennae in male ciliated, palpi rather long, curved, ascending, second joint rough-scaled, terminal moderate or short, more or less rough scaled in front, somewhat pointed. Thorax with large central or posterior crest. Abdomen with one or more crests. Tibia rough scaled. (Plate C., figs. 14, 15 neuration of *Plusia chalcites*.)

An extensive nearly cosmopolitan genus; the two New Zealand species are immigrants.

PLUSIA CHALCITES.

(*Plusia chalcites*, Esp., Schmett., 447, pl. cxli, 3; *P. eriosoma* Doubl., Dieff. N.Z., ii., 285; Meyr., Trans. N.Z. Inst., xix, 36; *P. verticillata*, Guen., Noct., II., 344; *P. rogationis*, ib., 344.)

(Plate X., fig. 5 ♀; Frontispiece fig. 10 egg; Plate II., fig. 1 larva.)

This insect is generally distributed in the North Island, and in the northern portions of the South Island. It has occurred very commonly at Taranaki, Wanganui, Napier, Nelson and Blenheim, but in Wellington it is rather a scarce species.

The expansion of the wings is about 1½ inches. The fore-wings are dark grey with bronzy reflections; there is a pale band on the termen and several of the transverse lines are indicated by paler colouring, the two basal ones being often silvery; the orbicular is partly outlined with golden-white, and the clavi-form is wholly filled in with the same colour. The hind-wings are yellowish-grey, darker towards the termen.

A variety is stated to occur in which the characteristic golden-white discal spots on the fore-wings are absent. A very pale variety is also found with the silvery discal markings partly confluent and larger than usual. In this form the cilia are whitish strongly barred with bronzy grey.

The egg is semiglobose, pale ochreous with branching ribs radiating from the micropyle and a few faint transverse ribs between them.

The larva has twelve legs; it is much attenuated towards the head; its colour is pale green, with a darker lateral line edged with yellow beneath; there are several wavy white lines and dots on the larva, as well as a few isolated black dots and hairs. It feeds on geranium, mint, bean, Scotch thistle, and many other garden plants and weeds. Its original food appears to have been the "potato

plant" (*Solanum aviculare*); but now it only occurs on this shrub in uncultivated localities, where there is no European vegetation.

The pupa is enclosed in a cocoon of white silk, generally situated between two dead leaves on or near the ground.

The moth first appears about September, and continues abundant until the end of summer. In Nelson I have seen it in great profusion, hovering over various flowers in the evening, at which time it also occasionally endeavours to gain access to beehives. In the same locality I have met with the young larvae in the middle of winter, so that there is probably a continuous succession of broods all the year through in favourable situations.

This insect is found in Australia, Pacific Islands, Africa, South Asia, South Europe, and occasionally in the South of England.

PLUSIA OXYGRAMMA.

(*Plusia oxygramma*, Hübn., Zutr., xxxvii., t. 769, 770; *P. transfixa*, Walk., Cat., xii, 884; *subchalybaea*, Ib., xxxiii., 833.)*

(Plate X., fig. 22 ♂, 23 ♀.)

This interesting species was first observed in New Zealand at the Thames by Mr. E. C. Sherlock. It has since occurred at Whangarei, on the Waitakerei Ranges, near Auckland, at Otahuhu, at Napier, and at Feilding. It is widely distributed throughout Asia, Australia and the Pacific Islands.

The expansion of the wings of the male is 1½ inches; of the female about 1½ inches. The fore-wings are grey, very slightly tinged with bronze; there is a conspicuous, curved, oblique, whitish discal streak reaching from the first line near the costa to the second line before the dorsum; the transverse lines are fine, rather obscure, blackish-brown. The hind-wings are greyish-brown, slightly darker towards the termen. In some specimens the discal streak is absent or replaced by an extremely minute whitish dot situated in the centre of a rather large, dark brownish-bronze patch, and the general colouring of both fore- and hind-wings is slightly darker.

Genus 25.—OPHIDERES, Boisdu.

Antennae in male ciliated. Palpi long, ascending, second joint thickened with dense appressed scales, terminal joint moderately long, slender, somewhat thickened towards apex, obtuse. Thorax clothed with hair-scales rather expanded posteriorly. Abdomen without crests.

Two species have occurred in New Zealand both of which have, no doubt, been accidentally introduced by shipping.

OPHIDERES FULLONICA.

(*Ophideres fullonica*, Linn., Syst. Nat., I., 812; Meyr., Trans. N.Z. Inst., xix, 37.)

A single greatly damaged specimen of what may be this species was taken in Christchurch and brought alive

*Dr. Turner considers this species is really *Plusia albostriata*, B. and G.

to Fereday very many years ago. No other specimens have since been observed in this country.

The expansion of the wings is about 4 inches. The fore-wings are brown marked with lighter and darker and greenish. The hind-wings are orange with a large lunule and terminal band black.

OPHIDERES MATERNA.

(*Ophideres materna*, Linn., Syst. Nat., i, 2, 840; Huds., Trans. N.Z. Inst., xl., 105, pl. xv., 5.)

Four specimens of this very large and conspicuous insect have been found in New Zealand—the first captured by Mr. Cook at Makara Beach, near Wellington, in May, 1906; the second by Mr. George Howes, F.E.S., at Dunedin, in March, 1907; the third at the Akaroa lighthouse, in October, 1917; and the fourth by Mrs. T. W. Taylor, at Nelson, in April, 1924.

The expansion of the wings is about 3½ inches. The head and thorax are pale reddish-brown. The fore-wings are very broad, triangular, with the termen slightly waved and bowed, pale yellowish-white, very thickly strewn with numerous brown and reddish-brown short wavy stripes; the central portion of the wing has strong bronzy-golden reflections, this portion being divided into three fairly defined patches by two oblique whitish bands; there are two large and two small reddish-brown spots in the centre of the wing. The hind-wings are rich orange-yellow, with a terminal black band and two round black spots near the middle.

This insect is stated to be attached to the banana tree, and the above mentioned specimens may have been accidentally introduced with consignments of that fruit.

Genus 26.—DASYPODIA, Guen.

Antennae in male ciliated. Palpi long, ascending, second joint thickened with dense scales, terminal joint moderately long, slender, somewhat thickened towards apex, obtuse. Thorax clothed with long hairs, without crest. Abdomen without crests. Posterior tibiae densely hairy. (Plate C., fig. 12, head of *Dasypodia selenophora*.)

An Australian genus; probably of only one species.

DASYPODIA SELENOPHORA.

(*Dasypodia selenophora*, Gn., Noct. iii. 175; Meyr., Trans. N.Z. Inst. xix. 38.)

(Plate X., fig. 13 ♀; Plate II., fig. 26 larva.)

This large and very handsome insect is generally distributed throughout the North Island. In the South Island it has occurred at Nelson, Richmond, Hokitika, Christchurch, Invercargill, and Dog Island, in Foveaux Strait.

The expansion of the wings of the male is about 3 inches; of the female fully 3½ inches. The fore-wings are very rich deep brown; there are two faint jagged transverse lines near the base and a distinct median shade; the reniform is very large, crescentic, steel blue, finely margined first with black, then with orange, and then again with black; the centre of the crescent is filled in with black; beyond this spot there are three fine black wavy transverse lines emitting several very sharp teeth between the reniform and the dorsum; there is a faint subterminal line. The hind-wings are rich brown, slightly paler

than the fore-wings; there are several wavy, transverse lines. The termen of both wings is slightly scalloped with a minute bluish-white dot at each indentation; the cilia are dark brown.

The egg, which is about one twenty-fourth of an inch in diameter, is dark blackish green, hemispherical, somewhat flattened and covered with many prominent branching ribs; between the ribs there are numerous depressions, which become somewhat regular hexagons on the top of the egg where the micropyle is situated. The larva, when first excluded from the egg, is about three-sixteenths of an inch in length, very slender, cylindrical, with large head; pale greyish-ochreous, becoming blackish-grey in the middle; there are numerous minute black warts, emitting stout black bristles; four elongate ventral prolegs and the usual anal prolegs. At this time the larva progresses like a true Geometer, and is very active. It does not eat the egg shell on emergence. After the first moult the larva is almost uniform dull black.

The length of the full-grown larva is about 2½ inches; it is stout, cylindrical, slightly flattened and a little tapering at each end; there are eight ventral prolegs; the back and sides are very dull deep yellowish-brown, thickly speckled with blackish; there are obscure dusky subdorsal and lateral bands; the head is brighter brown with two very deep chocolate bands in front; the top of segment 2 is also brighter brown; the anal segment is slightly yellowish; there is a series of minute pale dots in the middle of the lateral and subdorsal bands, each dot emitting a short hair; when the larva is walking rapidly two black bars appear on the back between segments 5 and 6, and 6 and 7; there is a white mark on the side of segment 9. The ventral surface is greyish with a very conspicuous black blotch in the middle of segments 5 to 12.

This caterpillar, which feeds on *Acacia*, is sluggish in its habits resting on the stems of its foodplant where it is extremely inconspicuous. It is full-grown about the end of January.

According to Colenso the pupa is enclosed in a cocoon formed of leaves fastened together with silk, the insect remaining in this condition for about two months. The pupa-case (after emergence) is nearly cylindrical, very obtuse at the head, and tapering regularly downwards from the end of the wing-cases, with the tail conical; the abdominal segments are very strongly marked. Its colour is dark red, with a bluish or violet bloom, but smooth and shining on its prominent parts.*

The perfect insect appears in February, March and April, but it is rather a scarce species. It is attracted by light, and thus occasionally enters houses, where specimens are generally captured. Hybernated individuals are sometimes found in October and November at which time the eggs are deposited.

Mr. Morris N. Watt has directed my attention to the fact that, when at rest, the two ringed eye-like marks together with the body and partly open wings, cause this insect to closely resemble the head of an owl, and that this would terrify any small bird which might otherwise be inclined to devour the moth. Mr. Watt's suggestion seems very possibly a correct explanation of the unusual wing markings and is extremely interesting.

This species occurs commonly in Eastern Australia.

A very closely allied form (*Dasypodia cymatoides*, Guen.), found by Colonel Tait in March, 1925, at Whangarei, has the ground colour of the wings darker and less brown than the ordinary *D. selenophora*. The marginal indentations are also stronger, and there is a conspicuous wavy subterminal line, faintly edged with bluish-white; on the fore-wings there is a small, but conspicuous, orbicular stigma, and on the hind-wings the wavy transverse lines, on the median area, are more conspicuous than in *D. selenophora*. Specimens of this form have also occurred at Leigh, Puhoi, Maungaturoto, and Whangamarino in the Auckland District.

Genus 27.—SERICEA, Guen.

Body stout. Proboscis rather long. Palpi long, nearly vertical; second joint stout, somewhat curved, pilose beneath; third slender, linear, obtuse at the tip, much more than half the length of the second. Antennae slender, simple, very much more than half the length of the body. Abdomen extending as far as the hind-wings; first, second and third segments tufted. Legs long, stout, pilose; hind tibiae with very long spurs. Wings broad, much denticulated. Fore-wings curved towards the tip of the costa, rectangular at the tips, slightly oblique and convex along the exterior border.

Represented by one species, no doubt accidentally introduced.

SERICEA SPECTANS.

(*Sericea spectans*, Guen., Noct., iii., 172.)

(Plate LI., fig. 12 ♀.)

A specimen of this very handsome insect was captured by Mr. W. Wastney at Nelson.

The expansion of the wings is about 3½ inches. All the wings are deep brown with strong purplish reflections; the fore-wings have several wavy blackish lines on the basal area; a large eye-like spot in the disc containing a small black rectangular mark and a blotch of metallic green; several wavy blackish lines around and below the discal spot, a distinct subterminal line and two lines parallel to the termen. The hind-wings have three very strongly curved transverse lines near the middle and an irregular black blotch, with two white centres, near the tornus.

Described and figured from an Australian specimen kindly lent to me by Mr. Philpott.

Genus 28.—RHAPSA, Walk.

Antennae in male bi-pectinated, towards apex simple. Palpi very long obliquely ascending, clothed with rough scales throughout, second joint in male with tuft of long projecting scales above towards apex, terminal joint moderate. Thorax clothed with scales, without crest. Abdomen without crest. Posterior tibiae with appressed scales. Fore-wings in male beneath with large broad costal fold on anterior half. (Plate C., figs. 16, 17 neuration of *Rhaphsa scotosialis*; fig. 18 head of ditto.)

We have one species in New Zealand. Another closely allied species occurs in South-east Australia, so similar that it might be thought identical, but with the antennae of the male furnished with long bristles instead

*Trans. N.Z. Inst., xi., 300.

of pectinations, and vein 8 of the hind-wings anastomosing with cell to beyond middle; the characteristic palpi and costal fold of the fore-wings are similar in both species.

RHAPSA SCOTOSIALIS.

(*Rhapsa scotosialis*, Walk., Cat. xxxiv., 1150; *Herminia litacina*, Butl., Proc. Zool. Soc. Lond. 1877, 388, pl. xlii. 11. *Rhapsa scotosialis*, Meyr., Trans. N.Z. Inst. xix. 33.)

(Plate X., fig. 6 ♂, 7 ♀, Frontispiece fig. 9 egg.)

This remarkable species is extremely abundant and generally distributed throughout the country. It is also found on Stewart Island.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings have the costa considerably arched towards the apex, and the termen is bowed outwards in the middle; the colour is pale brown in the male and dark brown in the female; there are several obscure black marks near the base; the orbicular is very small, orange or pale grey outlined in black, the claviform is absent, the reniform is conspicuous, the outer edge is much indented, the inner edge is outlined with dull orange-red, there is a blackish blotch between the orbicular and the reniform; beyond the reniform there is a curved transverse line followed by a series of minute black dots, then a very conspicuous wavy transverse line shaded towards the base of the wing; there is a pale apical patch and a series of small crescentic dark brown terminal dots; the cilia are dark brown. The hind-wings are greyish-ochreous; there is a rather faint line across the middle, followed by a broad shade; a series of small crescentic terminal dots; the cilia are dark greyish-ochreous. The antennae of the male are strongly bipectinated. The female is considerably darker, the markings are less distinct and numerous, and there is no blackish blotch between the orbicular and the reniform.

Both sexes vary considerably in the depth of the colouring, and in many freshly emerged specimens there is a purplish blush on the basal area.

The eggs are round, flattened below, bluish-grey or deep yellow becoming dull purplish about two days after being laid.

The young larva when first emerged, is about $\frac{1}{4}$ inch in length; the head is brown; the body dull white with a series of black tubercles round each segment, each tubercle emitting a tuft of bristles. The larva has sixteen legs, but the two anterior pairs of ventral claspers are not employed in walking, the caterpillar's mode of progression, consequently, resembling that of a larva with twelve legs only. The foodplant is *Mühlenbeckia* and probably many other plants. Both dead and green leaves are devoured. The length of the full-grown larva is about 1 inch; the head is small; the body short, rather stout, considerably flattened, with the anterior segments rapidly tapering; very dark brown, slightly reddish-tinged, with dull brown rings between the segments; there is a distinct lateral ridge and two rows of warts round each segment, each wart emitting a very short thick bristle; a small hump is situated on the back of the eleventh and twelfth segments.

This larva is of sluggish darkling habit, only coming abroad at night. It feeds on dead leaves generally.

The pupa is rather slender with the wing-cases very long. It is enclosed in a very loose cocoon, constructed of grains of earth and vegetable refuse on the surface of the ground.

There appears to be a continuous succession of larvae, and perfect insects almost the whole year through. The larvae feed freely all through the winter, and the perfect insects are most abundant in the late autumn. This species is very common amongst undergrowth in the forest. It is seldom found in the daytime, but at night it is extremely abundant in densely wooded situations. It flies in a very stealthy manner, and may soon be recognised on the wing by this feature alone. When disturbed it always secretes itself amongst dead fern fronds or other vegetable refuse, where its sombre colour effectually conceals it.

The costal fold on the under side of the fore-wing of the male contains a very large tuft of extremely long hairs. It probably emits a scent agreeable to the female.

Genus 29.—ANOMIS, Hübn.

Body rather stout. Proboscis moderately long. Palpi long, ascending; third joint linear, much more slender and a little shorter than the second. Antennae very minutely serrated, more than half the length of the body. Abdomen extending somewhat beyond the hind-wings. Legs rather long and slender; hind tibiae with four long spurs. Wings moderately long. Fore-wings straight in front, angular at the tips, slightly angular in the middle of the exterior border, which is slightly oblique; first, second and third inferior veins nearly contiguous; fourth remote.

Only one species has occurred in New Zealand, probably an artificial introduction from Australia.

ANOMIS SABULIFERA.

(*Anomis sabulifera*, Guen., Noct., II. 404.)

(Plate X., fig. 27 ♀.)

This common Australian insect was captured by Mr. Philpott at Nelson.

The expansion of the wings is slightly over $1\frac{1}{2}$ inches. The fore-wings are elongate-oblong, with a rather prominent projection in middle of termen; yellowish-brown, covered with numerous small blackish-grey markings, most condensed on the orbicular and reniform stigmata; there are traces of a strongly sinuate fine transverse line, from $\frac{1}{2}$ of costa to beyond middle of dorsum. The hind-wings are greyish-ochreous.

The perfect insect appeared towards the end of March, and was taken at light.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

Genus 30.—COSMOPHILA, Boisdu.

Body hardly stout. Proboscis moderately long. Palpi ascending, vertical; second joint stout, pilose; third cylindrical, acuminate, more than half the length of the second. Antennae pubescent or minutely pectinated, about half the length of the body. Abdomen extending a little beyond the hind-wings. Legs rather slender, not pilose; tibiae with very long spurs. Wings moderately broad. Fore-wings mostly luteous, straight in front, acute at the tips, angular in the middle of the exterior border.

Represented in New Zealand by a single very wide-ranging species, found in Africa, south of about 15° N., St. Helena, Ascension, Sokotra, Aden, Madagascar, India, Ceylon, Assam, Burma, South China, Formosa, Japan, throughout the Indo-Malayan and Australian regions, Marquesas, Fiji, Samoa.*

COSMOPHILA FLAVA.

(*Noctua flava*, Fabr. Syst. Ent., 601 (1775); *Noctua stigmatizans*, ib. 601; *Cosmophila indica*, Guen., Noct., ii. 396; *Cirroedia variolosa*, Walk., Cat., xi. 750; *C. dentata*, ib., 750; *Cosmophila aurantiaca*, Prittwitz., Stett. Ent. Zeit., xxviii. 277.)

(Plate IX., fig. 28 ♀.)

This bright-looking little species was first detected in New Zealand by Mr. E. S. West, at Otahuhu, near Auckland, in 1907. A second specimen was found by Mr. W. G. Howes, at Wellington, some three years later.

The expansion of the wings of the male is 1½ inches; of the female 1¼ inches. The fore-wings, which have the termen rather deeply indented below the apex and prominent above middle, are *bright orange-yellow finely speckled with brown (redder in the male)*; the transverse lines are slender, distinct, deep brown; a rather irregular line at base; first line from ⅓ of costa to ⅔ of dorsum, *forming a large loop with a line running upwards to the reniform stigma, thence running outwards and up to costa as the second line*; orbicular stigma very small, pale centred ringed with brown; reniform stigma cloudy, obscure blackish-grey, margined with brown towards base and termen; a broad, dusky purple subterminal band, in male much darker towards costa and termen; other portions of outer half of wing somewhat suffused with dusky brown, cilia dusky brownish-yellow, tipped with white. The hind-wings are pale ochreous, clouded with brown towards termen, paler in the male; the terminal cilia are brown and the dorsal cilia ochreous.

The perfect insect appears from January until March. In view of its extremely wide range, given under the generic heading, its occurrence in New Zealand is not surprising.

Described and figured from the specimen kindly lent to me by Mr. West.

*On some species of the genus *Cosmophila*, by W. H. T. Tams, Trans. Ent. Soc. Lond. 1924, 21.

CHAPTER X.

THE GEOMETRIDAE.

The *Geometridae* are characterized as follows:—

The maxillary palpi are obsolete. Fore-wings with vein 1b usually furcate, but with lower fork often weak or tending to be obsolete, 5 rising not nearer to 4 than to 6, parallel, 7 and 8 out of 9. Hind-wings almost always with frenulum, 1c absent. (Plate C., figs. 19 to 64.)

Imago with fore-wings more or less broad-triangular; hind-wings broad-ovate.

Larva with 10 or 12 legs only (Plate I., figs. 21-23, and 34-47; Plate II., figs. 2-25, 27, 31-33 and 40.)

Pupa with segments 9 to 11 free; not protruded from cocoon in emergence.

This family exhibits the same inequality of representation noticed in the others; three-fourths of the whole number of species belong to the sub-family Hydrimenides, which is very adequately represented, whilst the Selidosemides and Monocteniades are very imperfectly exhibited, and the other sub-families either wholly absent or indicated only by one or two casually introduced immigrants. Nearly all the local affinities are with the South American region, in accordance with the principles already laid down in Chapter III.; but the few Monocteniades are mainly related to Australian forms.

The numerous and very varied species comprised in this family render it by far the most attractive group of the larger Lepidoptera found in New Zealand. As in the *Noctuidae*, the dominant character of the colouring is protective, but in the much more brightly coloured *Geometridae* the objects chiefly imitated are delicate moss-covered tree trunks and beautiful lichens. Many of the species are highly variable which lends an additional interest to their study, and conveys an impression that they are specifically more numerous than is actually the case.

The number of species of *Geometridae* at present known in New Zealand is two hundred and forty-three, compared with two hundred and seventy-seven in Britain; seven hundred and twenty in Europe, and about two thousand three hundred and fifty in the whole of the Palaearctic Region. Contrasted with the British species, those found in New Zealand are on the whole much more gaily-coloured and handsomer insects, and in this respect the family offers a marked contrast to many of the others—notably the Butterflies and the *Arctiidae*.

Of the known species of *Geometridae* many are confined to high mountains, and it is thus probable that numerous novelties still await discovery in the mountain fastnesses of the south-western portion of the South Island.

The larvae of the *Geometridae* usually have only two pairs of prolegs which are situated on the tenth and thir-

teenth segments respectively. In a few genera, however, an additional pair is placed on the ninth segment. This arrangement of the prolegs compels the insect to arch up the middle of its body whilst walking, a habit which has given rise to the name Geometer, or earth-measurer. Our American friends call these caterpillars "measuring worms," and a familiar English title is "looper."

A considerable number of the larvae of the lowland species of our *Geometridae* are now known, and many of these are quite as attractive as the perfect insects. There is, however, abundant scope for future observers in the elucidation of the life-histories of the alpine and sub-alpine species, which form such an important element in the fauna.

The *Geometridae* are represented in New Zealand by the four following sub-families:—

- | | |
|------------------|-------------------|
| 1. HYDRIMENIDES. | 3. MONOCENIADIES. |
| 2. STERRHIDES. | 4. SELIDOSEMIDES. |

Sub-family 1.—HYDRIMENIDES.

The *Hydrimenides* are thus characterized:—

Fore-wings: 10 rising separate, anastomosing with 11 and 9 (forming double areole), or rising out of 11 and anastomosing with 9 (forming simple areole). Hind-wings: 5 fully developed, parallel to 4, 6 and 7 almost always stalked or connate, 8 anastomosing with upper margin of cell from near base to beyond middle, or seldom approximated only and connected by bar beyond middle. (Plate C., figs. 19-43.)

A very large sub-family of universal distribution, equally plentiful in New Zealand. The structure is very uniform throughout and the generic distinctions slight. Imago with body slender, fore-wings usually broad.

Ovum broad, oval, rather flattened with usually oval reticulations. Larva elongate, slender, with few hairs, without prolegs on segments 7 to 9; often imitating live or dead twigs and shoots. Pupa usually subterranean.

This sub-family is represented in New Zealand by the following seventeen genera:—

- | | |
|------------------|------------------|
| 1. TATOSOMA. | 10. VENUSIA. |
| 2. ELVIA. | 11. ORTHOCLYDON. |
| 3. MICRODES. | 12. ASAPHODES. |
| 4. PHRISSOGONUS. | 13. PARADETIS. |
| 5. CHLOROCYSTIS. | 14. XANTHORHOE. |
| 6. EUCYMATOGE. | 15. NOTOREAS. |
| 7. HYDRIMENA. | 16. DASYURIS. |
| 8. ASTHENA. | 17. LYTHRIA. |
| 9. EUCHOECA. | |

Genus 1.—TATOSOMA Butl.

Face smooth. Antennae gradually dilated from base to near apex, apex attenuated, in ♂ simple. Abdomen in ♂ extremely long. Fore-wings: areole double. Hind-wings small, in ♂ with dorsal lobe folded into a pocket, 8 free, connected with cell by bar before angle, in ♀ neuration normal.

An endemic genus; it is, however, a closely related development of the characteristically South American genus *Rhopalodes*, from which it differs by the unusual elongation of the male abdomen, and the absence of one of the proximal spurs of the hind tibia. The habits and life-histories of these curious insects should be an interesting study.

It will be seen on reference to Plate C, figs. 22 and 23, which represent the structure of the hind-wings of the male and female of *Tatosoma tipulata* respectively, that in the male veins 1 and 2 are absent, having no doubt become absorbed during the formation of the characteristic sexual lobe; vein 8 is connected with the margin of the cell by an oblique bar, this being probably due to an extension of the wing in the costal region, compensating for the loss in the dorsal region due to the above-mentioned lobe. In the hind-wings of the female the normal neuration of the family is almost preserved, the only peculiar feature consisting in the origin of veins 6 and 7 from a point on the margin of the cell.

We have eleven species, of which one is confined to the North Island, three to the South Island, and seven common to both islands.

TATOSOMA LESTEVATA.

(*Cidaria lestevata*, Walk., Cat., xxv. 1416. *Sauris ranata*, Feld. Reis. Nov., pl. cxxxi. 11. *Tatosoma lestevata*, Meyr., Trans. N.Z. Inst. xvi. 67.)

(Plate XII., fig. 4 ♂, 5 ♀.)

This beautiful species has occurred in the North Island at Thames, Wanganui, Morere, at the foot of the Tararua Range, and at Wainuiomata, near Wellington, and in the South Island at Nelson, Christchurch, Dunedin and Lake Wakatipu.

The expansion of the wings is 1½ inches. *The fore-wings are vivid-green; there are four wavy, black, transverse lines; the first near the base, the second a little before the middle, the third considerably beyond the middle, and the fourth near the termen; the subterminal line is very faint towards the tornus, and it emits three or four very sharp, longitudinal, black, tooth-like marks; all the transverse lines are much stronger where they cross the principal veins. The hind-wings are very pale yellowish-green.*

The perfect insect appears from November till February, but is rarely met with.

TATOSOMA TIPULATA.

(*Cidaria tipulata*, Walk., Cat., xxv. 1417; Meyr., Trans. N.Z. Inst. xliii. 71; *C. collectaria*, Walk., Cat., xxv. 1419; *Tatosoma agrionata*, Huds. N.Z. Moths, 40, pl. vi. figs. 26, 27; *Sauris mistata*, Feld., Reis. Nov., pl. cxxxi. 12.)

(Plate XII., fig. 8 ♂, 9 ♀.)

This fine species has occurred commonly in the North Island at Wellington. It is generally distributed in the South Island, and has also been found at Stewart Island.

The expansion of the wings is about 1½ inches. *The fore-wings are bright-green traversed by numerous black, wavy, transverse lines; these black lines are grouped into four more or less distinct bands, the outermost of which is interrupted at each of the veins; there is a conspicuous black dot in the middle of the wing, a number of small triangular, subterminal black marks and a series of minute terminal black dots. The hind-wings are ochreous, tinged with green towards the termen. In the female the abdomen is much shorter, and the hind-wings are larger than in the male. The palpi are fully twice as long as in the female of *T. agrionata*.*

The perfect insect appears from September till April. It frequents dense forests, and is generally found at rest on the trunks of trees. In these situations the pattern of the fore-wings is extremely protective, the whole insect bearing the closest possible resemblance to a patch of moss. This species may also be taken at sugar, and sometimes at light, but I have found that it can be obtained most plentifully by a careful scrutiny of the tree-trunks in a favourable locality. As a rule I think that the males are considerably commoner than the females. I have noticed them in the proportion of about four to one. According to Mr. Philpott the larva feeds on *Nothofagus cliffortioides* and *Weinmannia racemosa*.*

TATOSOMA AGRIONATA.

(*Cidaria agrionata*, Walk., Cat. xxv., 1417; Meyr., Trans. N.Z. Inst., xliii. 71; *C. inclinataria*, Walk., Cat., xxv., 1418.

(Plate XII., figs. 6 ♂, 7 ♀.)

This species has occurred on the lower slopes of the Tararuas and at Wellington in the North Island, and at Christchurch, Lake Wakatipu and Invercargill in the South Island. It is very closely allied to *T. tipulata*, and was for many years confused with that species.

The expansion of the wings of the male is 1½ inches; of the female 1¾ inches. On the fore-wings the green colouring is more or less confined to the neighbourhood of the veins and is much less pronounced than in *T. tipulata*; the basal and sub-terminal areas are traversed by several narrow cream-coloured bands, which are especially evident in the male, and the black markings are more extensive and slightly tinged with dull reddish. *The abdomen of the male is considerably shorter than in the same sex of T. tipulata and the anal lobe of the hind-wings nearly twice as large.*

The perfect insect appears from November till March, frequenting forest, where it is generally captured resting on tree-trunks. It seems to be a rarer insect than *T. tipu-*

*Trans. N.Z. Inst., xlix. 201.

lata. We are indebted to Mr. Philpott for apprehending the differences between this species and *T. tipulata*.

TATOSOMA MONOVIRIDISATA.

(*Tatosoma monoviridisata*, Clarke, Trans. N.Z. Inst., lii., 35.)

(Plate XLIX., figs. 6 ♂, 7 ♀.)

This very beautiful species was discovered by Mr. C. E. Clarke at Waitati, near Dunedin.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female slightly over $1\frac{3}{4}$ inches. It differs from *Tatosoma tipulata* in having the ground colour of a much deeper and richer green; the transverse markings very much less distinct and very deep green in place of black; the palpi distinctly longer in the male; the hind-wings greyish-ochreous strongly tinged with green especially on the termen and the anal lobe of the male smaller.

The perfect insect appears in November, and was beaten from *Coriaria*.

I am indebted to Mr. Clarke for the opportunity of figuring both sexes of this fine insect.

TATOSOMA TRANSITARIA.

(*Tatosoma transitaria*, Walk., Cat., xxv., 1419; Meyr., Trans. N.Z.

Inst., xliii., 71.)

This species is stated to be somewhat smaller than either *T. tipulata* or *T. agrionata* with the fore-wings duller, more grey-green, striae more obscure, with a characteristic distinct cloudy small whitish spot at lower extremity of transverse vein, hind-wings smaller, rather dark grey, lobe in male hardly larger than in *T. tipulata*.

I am unacquainted with this insect.

TATOSOMA ALTA.

(*Tatosoma alta* Philp., Trans. N.Z. Inst., xlv., 76.)

(Plate XII., figs. 10 ♂, 11 ♀.)

This very pretty little species has occurred in the South Island at Otira, on Bold Peak, Lake Wakatipu, and on The Hump, Southland.

The expansion of the wings of the male is slightly over 1 inch, of the female fully $1\frac{1}{4}$ inches. The fore-wings, which have the termen slightly bowed near the middle, are whitish with numerous very faint wavy greenish transverse lines; there are several interrupted blackish transverse lines near the base; a distinct median band, furcate on costa and dorsum, composed of fine wavy blackish transverse lines and sprinkled with reddish scales; a subterminal series of small blackish blotches and a terminal series of minute double dots. The hind-wings are greyish-ochreous, darker towards the termen, with a large elongate lobe in the male.

Appears to vary considerably in the general intensity of the markings and in the extent of the reddish irroration. In some specimens the discal and terminal areas of the fore-wings have purplish reflections.

The perfect insect appears in November and December, and inhabits sub-alpine forests, from about 1,500 to 4,000 feet above the sea-level. It is attracted by light.

This species is somewhat similar to *Tatosoma fasciata* from which, however, it may be easily separated by its much shorter palpi, straighter termen and larger lobe in the male.

TATOSOMA APICIPALLIDA.

(*Tatosoma apicipallida*, Prout., Trans. N.Z. Inst., xli., 122.)

(Plate XLIV., figs. 28 ♂, 29 ♀.)

This species was discovered by Mr. W. G. Howes on Ben Lomond, Lake Wakatipu. It has also occurred on the Humboldt Range in the same district and more recently on Mount Ruapehu, in the North Island.

The expansion of the wings is $1\frac{1}{2}$ inches. Very closely allied to *T. alta* from which it differs in its slightly larger size, darker colouring, greyer hind-wings, shorter abdomen of the male and distinct pale apical patch. The fore-wings in both sexes are suffused with iridescent pinkish reflections not present in *T. alta* and the fine wavy transverse lines are less confined to the sub-basal, median and subterminal areas of the fore-wings.

The perfect insect appears in November and December, and may be looked for in sub-alpine forests.

TATOSOMA FASCIATA.

(*Tatosoma fasciata*, Philp., Trans. N.Z. Inst., xli., 118.)

(Plate XLIV., fig. 31 ♂, Plate XII., fig. 1 ♀.)

This very interesting species was discovered by Mr. M. O. Pasco at Lake McKenzie. It has also occurred on Mount Arthur and the Hunter Mountains, at elevations of 3,500 feet.

The expansion of the wings is about $1\frac{1}{4}$ inches. The palpi are very long; in the female nearly half the length of the antennae, in the male one-third shorter than in the female. The fore-wings are rather broad, with the costa strongly arched at the base and the termen bent outwards below the apex, greyish-green in the male, white in the female, with blackish and orange-yellow markings; there is a fine irregular black line near the base, its extremity produced shortly along the dorsum; a rather broad sub-basal band thickly strewn with orange-yellow and blackish scales; a broad doubly curved blackish median band, fainter near the middle, especially on the costa, with its edges obscurely marked with broken orange-yellow lines; there are two interrupted subterminal lines composed of orange-yellow and greyish scales; a terminal shading of the same and a terminal series of double blackish dots; the veins are marked with orange-yellow. The hind-wings are white with two very faint greyish transverse bands. The cilia of all the wings are grey-whitish.

The perfect insect appears in November and December. It seems to be an extremely rare and local species, confined to mountainous districts in the South Island.

Described and figured from specimens kindly furnished by the late Mr. Pasco.

TATOSOMA TIMORA.

(*Tatosoma agrionata*, Meyr. (nec Walker) Trans. N.Z. Inst. xvi.

68. *Tatosoma timora*, Meyr., ib. xvii. 64.)

(Plate XII., fig. 2 ♂, 3 ♀.)

This rather sombre, though interesting insect, has occurred at Whangarei, Waimarino, Ohakune, Palmerston

and Wellington in the North Island, and at Christchurch, Akaroa, Otira and Invercargill in the South Island.

The expansion of the wings is $1\frac{1}{2}$ inches. *All the wings are sparsely covered with scales. The fore-wings of the male are dull reddish-brown, with numerous obscure transverse dusky stripes; there are two rather conspicuous blackish blotches on the costa, a dull white dot in the middle of the wing, a wavy, pale, transverse line near the termen, and a series of black terminal dots; the veins are dotted in black and white. The hind-wings are very small, dull grey, with the lobe large and conspicuous. The female is faintly tinged with green, the markings on the fore-wings are rather indistinct; the hind-wings are small, though much larger than those of the male.*

Varies considerably in the intensity of the markings, especially in the female. A rather rare form of the female has a large pale-centred brown or blackish blotch on the middle of the costa of the fore-wings.

The perfect insect appears from November till March. It frequents densely wooded districts, but except in certain restricted localities, is not a very common species. The males are usually taken in the proportion of about ten to one female.

TATOSOMA NIGRA.

(*Tatosoma nigra*, Huds., Ent. Mo. Mag., lviii., 196.)

(Plate L. fig. 22 ♀.)

A single specimen of this insect was captured in forest at Whakapapa on the lower slopes of Mount Ruapehu at an elevation of about 4,000 feet above the sea level.

The expansion of the wings of the female is $1\frac{1}{2}$ inches. The palpi are blackish, scarcely longer than the width of the head. The antennae are blackish with the apical portions dull ochreous. The head and thorax are dull greenish-ochreous; the abdomen is blackish densely speckled with whitish-ochreous. The fore-wings are rather broad with the termen very oblique, bowed outwards near the middle; there is a small dull greenish-ochreous basal patch, bisected by a broken black transverse line; the sub-basal area is black with a very few scattered white and dull reddish scales; the inner edge of the median band is bounded by a strongly dentate white line, with a very deep dentation just before the dorsum; its outer edge by a less dentate white line with a decided projection below the costa; within the median band there are three distinct wavy black transverse lines, the intervening spaces being dark grey; the costal, discal and dorsal portions of the median band have a few scattered dull green and reddish scales; the terminal and subterminal areas are almost black with scattered dull green, whitish and dull reddish scales, these are thickest on the terminal area; there is a series of black terminal dots arranged in pairs; on the dorsum the spaces between all the black transverse lines are strongly marked in white and the main veins are more or less strongly marked in black; the cilia are pale rusty-ochreous barred with blackish. The hind-wings are greyish-ochreous with a cloudy median line; the cilia are greyish-ochreous.

This species may be immediately recognised by its very short palpi and predominant black coloration.

The moth appears in January.

TATOSOMA TOPIA.

(*Tatosoma topia*, Philp., Trans. N.Z. Inst., xxxv., 247, pl. xxxii., 3, 4.)

(Plate XII., fig. 12 ♂, 13 ♀.)

This interesting little species was discovered by Mr. Philpott at West Plains, near Invercargill. It is generally distributed in the forest districts of Otago and Southland, and has also occurred at Christchurch and Otira. In the North Island it has been found at Waimarino, Horopito and Ohakune.

The expansion of the wings of the male is nearly $1\frac{1}{2}$ inches; of the female about 1 inch. The fore-wings have the basal patch, median band, and terminal area more or less clouded with dull green, the remaining portions being pale ochreous-brown, irregularly strewn with rusty-red and blackish scales; there is a conspicuous white patch on the median band below the costa and a smaller patch at the junctions of veins 3 and 4; a double curved line in the middle of the median band encloses the smaller patch and a much less distinct line encircles the larger one; all the veins are strongly marked by alternate black and white bars; two wavy brownish transverse lines are situated on the subterminal area and are followed by a wavy whitish line; there is a terminal series of double blackish dots. The hind-wings and cilia of all the wings are greyish-ochreous. In the female the dull green markings are less distinct; the disc is often considerably clouded with white and the patches of rusty-red scales usually more extensive.

The perfect insect appears from November till March. It flies freely at evening dusk, and is generally found in openings, or at the edges of forest.

Genus 2.—ELVIA Walk.

Face with cone of scales. Antennae in ♂ flattened, bipectinated. Palpi rather long, rough-scaled. Fore-wings: areole simple, 11 running into 12. Hind-wings normal. Wings longitudinally folded in repose.

An endemic genus containing one species.

ELVIA GLAUCATA.

(*Elvia glaucata*, Walk., Cat. xxv., 1430; Feld., Reis. Nov. cxxxii. 25. *Elvia donovani*, Feld., Reis. Nov. cxxxii. 5. *Elvia glaucata*, Meyr., Trans. N.Z. Inst. xvi. 65.)

(Plate XII., figs. 14, 15 varieties; Plate I., figs. 34, 35 larvae.)

This very beautiful insect is generally distributed throughout the country.

The expansion of the wings is about 1 inch. The fore-wings, which have the apex obtusely rounded and the termen slightly bowed, vary from pale green to deep steely blue (rarely pale orange-brown); there is a darker basal patch and median band each of which are bordered with somewhat wavy blackish lines; a large creamy-white patch is situated below the costa at about three-quarters, and there is a fine creamy-white subterminal line. The hind-wings, which have the termen deeply scalloped, are cream-coloured tinged with pale green or steely blue. The cilia of all the wings are pale greyish-ochreous, finely barred with blackish.

This species is extremely variable. In addition to the variations above indicated the markings of many speci-

mens differ considerably in intensity, and there are sometimes one or two cream-coloured and rusty-red blotches towards the base or middle of the fore-wings.

The egg, which is laid flat, is about one-fortieth of an inch in length, oval, cylindrical, sunken in the middle, with the surface covered with very shallow, irregular, hexagonal depressions. The colour is pale whitish-ochreous, becoming much darker as development progresses.

The larva, which feeds on *Rubus australis*, during the spring and early summer, is about $\frac{3}{4}$ inch in length, very stout, cylindrical, slightly tapering towards each extremity, rather dull green; there is an indistinct pinkish lateral line, the legs and anal flap being also pink; several conspicuous black subdorsal warts are situated on segments 5–11, each wart emitting a black bristle, and other smaller warts and bristles occur sparingly on the larva.

This caterpillar is rather variable and some specimens are almost entirely suffused with pinkish. It is sluggish in its habits, clinging firmly to the thorny stems of its food plant, from which it can only be dislodged with considerable difficulty.

The perfect insect appears from September till March, but is not a common species. It frequents forest districts, and may sometimes be found at rest on tree-trunks, where the beautiful colouring of its fore-wings closely imitates that of certain lichens, and renders its detection in such situations extremely difficult. This species closes its wings when at rest, the anterior pair alone being visible. They are not held flat, but are curiously folded longitudinally, and the end of the abdomen is also curled upwards. By slightly raising the insect above the level of the surrounding surface, this peculiar attitude considerably increases its resemblance to a lichen growing on the stem or branch of a tree. This species is sometimes found in the middle of winter, and it evidently passes that season as a hibernating imago.

Genus 3.—MICRODES Güen.

Face with cone of scales. Antennae in ♂ simple or ciliated. Palpi long or very long, rough-scaled. Fore-wings: areole simple, 11 running into 12. Hind-wings in ♂ reduced, narrowed or distorted.

A very small genus confined to Australia and New Zealand. We have two species.

MICRODES EPICRYPTIS.

(*Microdes epicryptis*, Meyr., Trans. Ent. Soc. Lond., 1897, 384.)

(Plate XI., fig. 2 ♀.)

This rather inconspicuous species has occurred at Paraparaumu, Plimmerton and at Wellington in the North Island, and at Dunedin and Invercargill in the South Island.

The expansion of the wings is nearly 1 inch. *The palpi are fully as long as the thorax.* The fore-wings, which have the costa very strongly arched and the termen very oblique slightly bent below the middle, are pale whitish ochreous very broadly

shaded with pale brown along the costa; there are often three black dots on the veins at about $\frac{1}{3}$; a faint discal dot and a strongly curved series of minute black dots at about $\frac{2}{3}$. The hind-wings are pale whitish-ochreous.

The perfect insect appears from September till March, and is attracted by light. It is a rare species, but seems to be usually met with in cultivated districts.

MICRODES QUADRISTRIGATA.

(*Microdes quadristrigata* Walk., Cat. xxv., 1200; Meyr., Trans. N.Z. Inst. xvii., 67; *interclusa* Walk., Cat. xxiv., 1202; *torjata* Feld., Reis. Nov. pl. cxxxi., 34; *Chloroclystis rectilineata* Huds., N.Z. Moths, 45, pl. vi., 22.)

(Plate XI., fig. 1 ♀.)

This species has occurred at Otaki, Wellington, and Stewart Island.

The expansion of the wings is $\frac{3}{4}$ inch. *The fore-wings are pale grey;* there are several irregular black, transverse lines near the base, very broad on the costa; a broad, pale, central area with no distinct markings; then two very fine, almost straight, parallel, dark transverse lines alternating with two broader white lines, and followed by a very conspicuous black line, this being again immediately followed by a fainter black line; beyond these lines the wing is darker, with a wavy transverse white line and a row of black terminal marks. The hind-wings are grey with several faint, wavy, transverse lines and a series of darker marks on the termen. The cilia of all the wings are grey.

The perfect insect appears in April.

Genus 4.—PHRISSOGONUS Butl.

Face with small cone of scales. Antennae in ♂ simple or ciliated. Palpi moderate, rough-scaled. Abdomen slightly crested. Fore-wings in ♂ with glandular swellings or projecting tuft on costa; areole simple, 11 running into 12. Hind-wings normal.

A small Australian genus, of which two species are found also in New Zealand.

PHRISSOGONUS LATICOSTATUS.

(*Larentia laticostatus*, Walk., Cat. xxiv., 1196; *Scotosia canata*, lb., xxv., 1357; Butl., Ann. Mag. Nat. Hist. (5) ix., 94; *Phrissogonus laticostatus*, Meyr., Proc. Linn. Soc. N.S.W., 1890, 801; Trans. N.Z. Inst., xlv., 22.)

(Plate XI., fig. 3 ♂, 4 ♀.)

This interesting little insect has occurred at Whangarei, Auckland, Wanganui, Waipukurau, Masterton, Otaki, and Plimmerton in the North Island, and at Nelson in the South Island.

The expansion of the wings is $\frac{3}{4}$ inch. *The fore-wings of the male have the costa very strongly arched at the base with a conspicuous tuft of scales at about one-fifth, the apex acute and the termen very oblique; brownish-ochreous; the basal area is traversed by several wavy darker lines; the median band is very broad, its inner edge gently concave, its outer edge somewhat irregular, darker brown traversed by paler lines; there are several darker patches on the terminal area and the entire wing is very faintly dappled and streaked with whitish.* The hind-wings are very pale brownish-ochreous with many wavy darker lines and a very large patch of dark grey scales on the

costa. In the female the costa of the fore-wings is straighter, and the inner and outer edges of the median band are bordered by blackish-brown lines. The hind-wings are whitish-grey with many faint grey wavy lines, but no grey patch on the costa.

The sexual differences in this species are very remarkable.

The perfect insect appears in March and April. It is very common throughout Australia, and has probably been introduced into New Zealand by artificial means. It also occurs in the Kermadec Islands.

PHRISSOGONUS TESTULATUS.

(*Phibalapteryx testulata*, Guen. Lep. x., 352; *Scotosia denotata*, Walk., Cat., xxv., 1361; *Phibalapteryx parvula*, Walk. Cat. xxvi., 1721; *Phrissogonus denotatus*, Meyr., Trans. N.Z. Inst. xx., 53; Proc. Linn. Soc. N.S.W., 1890, 798; Huds. N.Z. Moths, 45, pl. vi., 19.)

(Plate XI., fig. 7 ♂.)

This very dull-looking insect is common and generally distributed throughout the country, and has occurred in the Chatham Islands.

The expansion of the wings is $\frac{3}{4}$ inch. All the wings are greyish-ochreous, with numerous obscure brown transverse lines; there is often a dark brown blotch in the disc of the fore-wings and several black dots on the veins; the cilia are dull pink barred with black. The male has a peculiar dilation on the costa beyond the middle, beneath which is a naked longitudinal mark occupying the space between veins 10 and 12, these veins being slightly distorted in consequence. The antennae are simple in both sexes. The female is slightly tinged with reddish-brown and it is by no means easy to separate the female of *P. testulatus* from the female of *Chloroclystis semialbata*.

The perfect insect appears from October till February. It frequents dense undergrowth in the forest, and is generally found resting with extended wings on tree-trunks where it is practically invisible.

This species is found in the Kermadec Islands, and is common and widely distributed in Australia and Tasmania.

Genus 5.—CHLOROCLYSTIS Hübner.

Face with small cone of scales. Antennae in ♂ ciliated or simple. Palpi moderate or long, rough-scaled. Abdomen slightly crested. Fore-wings: areole simple, 11 running into 12. Hind-wings normal. (Plate C., figs. 19, 20 neuration of *Chloroclystis bilineolata*.)

A rather extensive genus, well represented in India; occurring also in Africa, Europe and Australia, but nowhere so prominent as in New Zealand.

This very interesting genus includes no less than thirty-three New Zealand species, of which six are confined to the North Island, nine to the South Island, and eighteen common to both islands. Most of the insects are of moderate or small size, and are often very variable. Many are extremely beautiful with the wing patterns of great complexity. The larvae principally feed on blossoms, attaining full growth with unusual rapidity, the duration of larval life being necessarily limited to the period during which the foodplant is flowering. The pupa state is often

very prolonged, some of the species passing the winter in that condition, and in these cases the perfect insects usually emerge shortly before their foodplants burst into flower. Owing to their extreme variability, there is often great difficulty in fixing the limits of the species, and further extensive investigations will be required before an adequate knowledge of them is obtained.

This genus is, in fact, a field in which much original work remains to be done by future naturalists, especially in connection with breeding the more difficult forms, some of which are at present very imperfectly known. It is also very probable that further new species of *Chloroclystis* will be discovered in some of the less explored districts, which have not yet been properly worked by collectors.

When identifying many of the difficult and extremely variable species included in this genus, special notice should be taken of the length of the antennal ciliations and, in order to facilitate this, the species have been grouped into three sections in conformity with this character.

Section A. Antennae in male simple.

CHLOROCLYSTIS INDUCTATA.

(*Coremia inductata*, Walk., Cat. xxv., 1322; *Scotosia subitata*, ib., 1362; *Cidaria semilineata*, Feld., Reis. Nov. pl. cxxxi., 36.)

♀. Dull fawn-colour, slender. Palpi obtuse, slightly ascending, extending somewhat beyond the head. Antennae rather stout. Wings rather small. Fore-wings somewhat obtuse at the tips; interior line black, slender, oblique, nearly straight, hardly denticulated; a black exterior discal streak; costa and veins slightly marked with black; submarginal line pale cinereous, zig-zag; marginal line black; exterior border slightly convex, very oblique. Hind-wings cinereous, with traces of lines along the interior border; exterior border slightly truncated in front and hindward. Length of body $4\frac{1}{2}$ lines; of the wings 10 lines.

I am unacquainted with this species. The above is copied from the original description.

CHLOROCLYSTIS SEMIALBATA.

(*Eupithecia semialbata*, Walk., Cat. xxvi., 1708; Meyr., Trans. N.Z. Inst., xlv., 23; *Eupithecia indicataria*, Walk., Cat., xxvi., 1708; Meyr., Trans. N.Z. Inst., xx., 52; Huds. Subantarctic Islands of N.Z. pl. II., 20-22.)

(Plate XI., fig. 5 ♂, 6 ♀. Plate I., fig. 42 larva.)

This rather dull-looking species is common and generally distributed throughout the country. It is also found at Stewart Island, and in the Auckland, Chatham and Kermadec Islands.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings of the male are usually very pale greenish-grey or reddish-grey with numerous blackish or dull reddish wavy transverse lines, darker on the main veins; there is usually a distinct pale somewhat crescentic mark near the termen above the middle with a rust-red spot beyond it. The hind-wings are pale grey, with several faint wavy transverse lines; the termen has a large rounded projection near the middle. The female, which is difficult to identify, is browner than the male, the transverse lines are more numerous and distinct, especially on the hind-wings,

and the termen is almost regular. *The antennae are simple in both sexes.*

There is great variation both in ground colour and markings. In some specimens the whole of the discal area of the fore-wings is clouded with blackish-grey; in others the dorsal half of the disc is pale green, whilst in others the whole of the disc is creamy-white.

The larva, which feeds on the blossoms of the bush-lawyer (*Rubus australis*), rangiora (*Brachyglottis repanda*), and probably many other native flowers, is about $\frac{1}{2}$ inch in length, rather stout, slightly tapering at each end, with the segmental divisions distinct and the surface of the skin strongly wrinkled transversely; very pale green, whitish, or greyish-green, with a brown dorsal line, and two more or less conspicuous brown diagonal dorsal marks on segments 5, 6, 7, 8 and 9; a blackish dorsal stripe on last two segments; an irregular whitish lateral ridge with several pinkish spots situated thereon. The larva is of sluggish habit, feeding amongst the blossoms, where it is very inconspicuous. It is very variable both in colour and markings.

The pupa is very short and stout, and is concealed in a loose cocoon amongst the refuse of the blossoms.

The perfect insect appears almost the whole year through, and is often met with in the middle or late winter. It is fairly common in wooded localities, and is sometimes attracted by light.

Section B. antennae in male with long fasciculate cilia-tions.

CHLOROCYSTIS SANDYCIAS.

(*Chlorocystis sandycias*, Meyr., Trans. Ent. Soc. Lond., 1905, 219; *Chlorocystis plinthina*, Huds., N.Z. Moths, 41, pl. vi., 8.)

(Plate XI., figs. 11-13 varieties. Plate I., figs. 37, 38 larvae.)

This very pretty and variable little species is common in certain restricted spots near Wellington. It has also occurred at Christchurch, Otira and in the Invercargill district.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The basal area of the fore-wings is pale brown traversed by several blackish-brown lines; the median band is usually pale green or pale ochreous, often with a large pure white blotch which then covers most of the disc; the outer area is bright chocolate-brown, very broad at the apex but rapidly tapering towards the tornus; there is the usual wavy, pale subterminal line. The hind-wings are pale cream-coloured tinged with pinkish-brown, or green, on the dorsum and termen; there are several pale wavy transverse lines, much stronger on the dorsum. There is a series of minute terminal marks and the cilia of all the wings are pinkish-brown barred with black.

This species may be recognised by its small size; the rich reddish or brown subterminal marking broadest at the apex, and the pale green, ochreous, or snow white discal patch. *C. plinthina*, which somewhat resembles it, may be at once distinguished by its much longer palpi and paler colouring.

The larva, which feeds on the blossoms of *Coprosma areolata* and *C. rotundifolia*, is also very variable. Its

length when full-grown is about $\frac{3}{4}$ inch; the head is very small, pale ochreous; the body very stout tapering towards the head, dull greyish-green, or rich purple, many intermediate forms occurring; there is a conspicuous, elongate, triangular, blackish mark behind the head extending to the fifth segment; V-shaped marks are situated on segments 6, 7 and 8, which are humped; the remaining segments are paler with faint irregular lines on the sides; there are numerous minute ring-shaped markings over the entire insect. This larva is very active, and clings tightly to the twigs of its foodplant which it closely resembles, its general colour pattern making it look like a roughened twig. The young caterpillars are first observed early in October, and are nearly all full-grown by the end of the month, the life of the larva thus practically synchronizing with the flowering period of both of its foodplants.

The pupa is enclosed in a small cocoon constructed of silk and refuse amongst the twigs of the foodplant.

The perfect insect appears in December, and is sometimes very common amongst wind-swept scrub on hills, where there is an abundant growth of *Coprosma areolata* and *C. rotundifolia*.

CHLOROCYSTIS RIVALIS.

(*Chlorocystis rivalis*, Philp. Trans. N.Z. Inst., xlviii., 421.)

(Plate XV., fig. 18 ♀ from Mount Ruapehu.)

This very dark-looking little species was discovered by Mr. C. C. Fenwick on Bold Peak, at the head of Lake Wakatipu. It has also been taken in the Routeburn Valley, and on the Hunter Mountains, at an elevation of about 3,250 feet above the sea-level, as well as on Mounts Egmont and Ruapehu in the North Island.

The expansion of the wings is about $\frac{1}{2}$ inch. In the general character of its markings this species closely resembles *Chlorocystis sandycias* but is very much darker in both fore- and hind-wings.

Specimens from Mount Egmont and Mount Ruapehu are smaller and darker than those from the south, but beyond this there does not appear to be any important variation.

The perfect insect appears in December and January, and may be looked for amongst sub-alpine scrub.

CHLOROCYSTIS PLINTHINA.

(*Pasiphila plinthina*, Meyr., Trans. N.Z. Inst., xx., 49.)

(Plate XI., fig. 10 ♂.)

This very faintly-marked species has occurred at Wellington, Invercargill and Stewart Island.

The expansion of the wings is about $\frac{1}{2}$ inch. The palpi are fully as long as the thorax. All the wings are whitish, sometimes very slightly tinged with green; the fore-wings have an indistinct brownish basal patch; a row of blackish dots on the veins at about one-third and another curved row at two-thirds representing the edges of the median band; there are faint diffused reddish patches on the termen below the apex, and above the tornus. The hind-wings have a conspicuous blackish discal dot and wavy reddish subterminal line. The cilia of all the wings are dull whitish, faintly barred with blackish.

The perfect insect has been taken in May, July and August. It seems to be a rare species, but as it appears during the winter months is probably often overlooked. This insect is nearest to *Chloroclystis sandycias* with which it has been confused. It may, however, be immediately known by its long palpi, and very indistinct markings.

CHLOROCLYSTIS MELOCHLORA.

(*Chloroclystis melochlora*, Meyr., Trans. N.Z. Inst., xliii., 58.)

(Plate XI., fig. 14 ♂.)

A few specimens of this very vivid green species have occurred at Otira, on Bold Peak and around Glenorchy, Lake Wakatipu.

The expansion of the wings is about 1 inch. The fore-wings are rather pale green with greenish-black transverse markings; there is a well-defined line at the base followed by a paler curved band; the median band is strongly curved oblique, with its outer edge slightly angulated, its central portions are paler containing a distinct black discal spot; there is a series of greenish-black blotches on the subterminal area, and the cilia are green with blackish bars. The hind-wings are whitish-ochreous, broadly, clouded with pale green on the dorsum and termen; there are numerous blackish-green transverse markings on the dorsum faintly produced about half way across the wing; there is a terminal series of black marks and the cilia are pale green barred with black.

In some specimens the veins of the fore-wings are broadly marked in bright yellow except where they are crossed by the blackish transverse lines.

The perfect insect appears in December and January and frequents forests.

CHLOROCLYSTIS MUSCOSATA.

(*Eupithecia muscosata*, Walk., Cat. xxv. 1246; *Pasiphila muscosata*, Meyr., Trans. N.Z. Inst., xx. 50; *E. cidariaria*, Gn., Ent. Mo. Mag., v., 62; *Cidaria aquosata*, Feld., pl. cxxxii., 38; *Chloroclystis bilineolata*, Huds., N.Z. Moths, pl. vi., 9, 10.)

(Plate XI., fig. 15 ♀; Plate I., fig. 44 larva.)

This beautiful little species is fairly common at Auckland, and in the Wellington District in the North Island. In the South Island it has occurred at Nelson, Christchurch and Invercargill. It is also found on Stewart Island.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are bright green with numerous wavy darker lines. There is a jagged transverse black line near the base, two at about one-fourth, enclosing a rather paler space; beyond this there is an indistinct broad darker median band edged with several rather irregular, fine black marks, and an obscure white patch below the apex. The hind-wings are grey slightly tinged with reddish; the dorsum and termen are shaded with green, and there is a number of curved black lines on the dorsum; the cilia of all the wings are dull greenish-grey barred with blackish. The termen of the fore-wings is slightly bowed, and all the wings are finely scalloped and sharply outlined in black.

A very distinct variety frequently occurs in which the entire ground colour is orange-yellow. This variety can be artificially produced by exposing a typical specimen to the fumes of bruised laurel leaves. Intermediate forms may also be found, but are much scarcer than either the typical form or the variety.

The larva, which feeds on the leaves of *Mühlenbeckia* and on the flowers of *Myrtus bullata*, in January, is about $\frac{3}{8}$ inch in length, considerably attenuated towards the head, with the segments strongly indented and the surface much wrinkled; its general colour is brown, or purplish-brown, with rich dark brown markings; there are humps on segments 6, 7, 8, 9 and 10, the largest on segment 8, each being much accentuated by a dark brown border; both extremities of the larva are clouded with dark brown, and there is a series of dark brown, or dark greenish-brown diagonal stripes.

This larva, which varies considerably both in colour and markings, imitates in general appearance the withered flower-heads of its foodplants. It often rests with the body twisted and sways from side to side whilst walking.

The pupa is enclosed in a very loose cocoon on the surface of the ground.

The perfect insect appears from September till May, and is sometimes fairly common. It rests on tree-trunks with outspread wings, in which position it so closely resembles a patch of moss that it is extremely difficult to detect, even when specially searched for.

The other green species (*Chloroclystis melochlora*, *C. punicea*, *C. paralodes*, *C. semochlora* and *C. bilineolata*) with which the present insect might be confused are stouter and more robust-looking forms. *C. muscosata* is, in fact, a decidedly fragile-looking insect.

CHLOROCLYSTIS PUNICEA.

(*Chloroclystis punicea*, Philp., Trans. N.Z. Inst., liv., 148.)

(Plate XLVIII, fig. 12 ♀.)

This fine insect has occurred at Kaitoke in the North Island. In the South Island it has been taken at Waitati, near Dunedin, and at Rowallan, Waiau, Southland.

The expansion of the wings is slightly over 1 inch. The fore-wings of the male are bright green more or less speckled with blackish; duller and greyer in the female; the basal patch and subbasal areas are pinkish and are traversed by two dentate black lines; the inner portion of the median band is whitish (in the female) the outer portion vivid green; its outer edge, which is twice incurved on upper half, is finely but interruptedly margined with black; beyond the median band the ground colour becomes greyish pink; there is a jagged clear green subterminal line and the termen is marked with an almost continuous black line. The hind-wings are whitish, faintly clouded with pink and green along dorsum and termen; there is a black discal dot and numerous wavy broken blackish transverse lines clearly defined towards dorsum. All the cilia are yellowish-green barred with black.

Generally speaking the male is much greener in its colouring than the female, but both sexes are characterized by the prevalence of pinkish suffusion.

The perfect insect appears in November and December, and may be looked for in forest or scrub.

Described and figured from a specimen kindly given to me by Mr. C. E. Clarke.

CHLOROCYSTIS PARALODES.

(Chlorocystis paralodes, Meyr. Trans. N.Z. Inst., xlv., 23.)

(Plate XI., fig. 20 ♂, 21 ♀; Plate I., figs. 40, 41 larvae.)

This very beautiful insect is found fairly commonly in the neighbourhood of Wellington. A large very vividly coloured form also occurs in the forests on Mount Egmont and Mount Ruapehu, about 3,000 feet above the sea-level.

The expansion of the wings is slightly under 1 inch. The fore-wings of the male are rather dull green with pale blackish-brown markings; there is a distinct basal transverse line; a curved transverse band before the middle irregularly waved and becoming much wider a little before the dorsum; a series of wavy transverse marks on the costa; a conspicuous crescentic black mark in the upper portion of the disc at about three-quarters followed first by a whitish line and then by a blackish patch which emits two fine lines meeting the termen; there are several fine wavy subterminal lines followed by a clear green terminal area. The hind-wings are pale pinkish-white clouded with green towards the base and termen; there is one strong, and several faint blackish bars on the dorsum, continued across the wing as very faint wavy transverse lines. The cilia of all the wings are pink strongly barred with black. In the female the fore-wings are usually a brighter green; the disc is often more or less clouded with white and yellow, and the principal veins are marked in white, but these characters may be present to some extent in male specimens also. A very rare form of the female is entirely white with blackish markings.

The larva, which feeds on the leaves and blossoms of the common veronica (*Veronica salicifolia*), is about $\frac{3}{8}$ inch in length, somewhat attenuated towards the head, dull green with a prominent yellow lateral ridge and the segmental divisions marked in yellow; the terminal segment and anal proleg are pale brown. Some larvae have a dark green dorsal band margined with short black bars on each segment, whilst in others the dorsal band is bright reddish-brown.

This larva is very sluggish in its habits during the day, at which time it can only be dislodged from its foodplant with great difficulty, and the highly protective nature of its colouring renders its detection a hard matter. At night, however, it may easily be found, with the aid of a good lantern, and is most abundant when the veronics are in flower.

The pupa state is spent in the earth and, in the case of autumnal larvae, lasts the whole winter.

The perfect insect appears in captivity as early as August or September, but is seldom then met with at large. In the autumn, however, it may be found abundantly at night on the veronica blossoms, in company with its larva. Thus it is practically certain that there are two broods in a season; the moths of the spring emergence giving rise to larvae which feed on the leaves of the veronica during November and December. These summer larvae become the moths which appear from February till April, and are the parents of the autumnal larvae.

CHLOROCYSTIS SEMOCHLORA.

(Chlorocystis semochlora, Meyr. Trans. N.Z. Inst. li., 349.)

(Plate XLVIII., fig. 3 ♂; 4 ♀.)

This beautiful species has occurred in the forest on the lower slopes of Mount Egmont at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is slightly over 1 inch. It is very closely allied to *Chlorocystis paralodes*, but is larger, greener, and quite distinct by absence of black band on abdomen, broader wings without the black markings of *paralodes*, but with a characteristic grey spot beyond median band, and somewhat shorter fascicles of antennae.

The perfect insect appears in February.

CHLOROCYSTIS ZATRICHA.

(Chlorocystis zutricha, Meyr., Trans. N.Z. Inst., xlv., 24.)

This species, which is apparently extremely similar to *Chlorocystis paralodes*, has been taken at Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. "Palpi 1 $\frac{1}{2}$. Antennal ciliations 3 $\frac{1}{2}$. Abdomen with blackish subbasal band. Fore-wings elongate-triangular, termen obliquely rounded; light brownish-ochreous partially suffused with dull-greenish; a curved blackish stria near base; near beyond this a fascia of light red-brownish suffusion, marked with black on costa; median band margined anteriorly by a light brownish-tinged fascia edged with blackish striae, and posteriorly by a blackish spot on costa, a black subrescenscent mark above middle, and some black dots below this; a blackish transverse discal dot on end of cell; pre-subterminal fascia tinged with brownish on upper half, marked with black towards costa, and with a spot of black suffusion above middle; above tornus narrowly brownish; an interrupted black terminal line: cilia light-greyish, basal half pale-brownish spotted with blackish. Hind-wings elongate, unusually narrow, termen rounded; lower half of disc anteriorly clothed more densely than usual with long hairs; ochreous-grey-whitish, dorsal half suffused with light ochreous, edges of median band indicated on dorsal half by striae of blackish irroration; a round dark-grey discal dot; a blackish-grey terminal line: cilia whitish-grey, basal half crimson-tinged and spotted with dark grey."

I am unable to identify this form. The above is a copy of the original description.

CHLOROCYSTIS LACUSTRIS.

(Chlorocystis lacustris, Meyr., Trans. N.Z. Inst., xlv., 24.)

(Plate XI., fig. 19 ♂.)

This is another obscure species which has been taken on Arthur's Pass and on the Lake Harris Track at the head of Lake Wakatipu, at elevations of about 3,000 feet above the sea-level.

The expansion of the wings is about 1 inch. The fore-wings are rather elongate with the apex somewhat produced and the termen oblique very slightly bowed, pale green; there is a small reddish-brown basal patch; a fine green line, then a moderately broad band and another fine green line; a very broad dark brown median band and a very broken broad brown subterminal band; the cilia are greenish-grey barred with blackish. The hind-wings are greyish-ochreous with numerous faint brown streaks on the dorsum and dark brown terminal marks; the cilia are pale ochreous barred with dark brown.

In some specimens the green colouring is replaced by warm brownish-ochreous.

The perfect insect appears in January, and frequents sub-alpine scrub.

CHLOROCLYSTIS BILINEOLATA.

(*Eupithecia bilineolata*, Walk. Cat. xxv., 1246; *Chloroclystis antarctica*, Huds., N.Z. Moths, 42, pl. vi., 20.)
(Plate XL, fig. 8 ♂; Plate XLIV, fig. 4 variety.)

This very obscure species seems to be generally distributed throughout Otago and Southland.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are rather dull green; there is a reddish-brown patch near the base, followed by two, slightly oblique, reddish bands; the central band is very broad, green, traversed by numerous fine wavy lines; there is a broad reddish band on the termen. The hind-wings are slaty-grey, tinged with pink towards the termen and dorsum. The cilia of all the wings are pink barred with black.

A rather remarkable brown form with similar markings to the ordinary *C. bilineolata* occurs on Arthur's Pass, and is depicted on Plate XLIV., fig. 4.

The perfect insect appears from November till February, and frequents forest.

The specific name *bilineolata* has from time to time been applied to many different species in the genus and since so many new forms have been recognised it has become increasingly difficult to define what constitutes the true *bilineolata*. It is perhaps an open question whether the name *bilineolata* should not be dropped altogether.

CHLOROCLYSTIS LUNATA.

(*Chloroclystis lunata*, Philp., Trans. N.Z. Inst., xlv., 115.)
(Plate XI, figs. 22, 23 ♂ varieties, 24, 25 ♀ ditto; Plate I, fig. 23 larva.)

This very variable and dark-looking species is common in the vicinity of Wellington, and has also occurred at Invercargill, Dunedin and Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are dark brownish-ochreous; the principal markings closely resemble the dark markings in *C. paralodes* except that there are very numerous fine wavy blackish and brown transverse lines. In the male there is often a large ochreous patch on the lower half of the disc of the fore-wings, which is rarely snow-white. Both sexes often have a white crescentic mark in the disc but although the insect takes its name from this marking, it must not be regarded as a reliable character. The hind-wings are ochreous-brown much darker towards the dorsum; there are numerous wavy transverse lines. All the wings have a very distinct wavy white subterminal line, and the cilia are pinkish brown barred with black.

In its life history and habits this species closely resembles *C. paralodes*, except that the perfect insect does not appear until the end of December, the pupa state lasting fully eight months, and the feeding time of the larva consequently coinciding with the flowering of the veronica. The longer antennal ciliations in the male of *C. paralodes* must be deemed to separate that species from *C. lunata*, but apart from this fact the two species might

reasonably be regarded as green and brown varieties of the same insect.

CHLOROCLYSTIS COTINAEAE.

(*Chloroclystis cotinacae*, Meyr. Trans. N.Z. Inst., xlv., 25.)

A single specimen of this species was captured by Mr. Meyrick at Masterton in the year 1883. No other has since been found.

The expansion of the wings is about $\frac{3}{4}$ inch. Palpi 2 $\frac{1}{2}$. Antennae ciliations 3 $\frac{1}{2}$. The fore-wings are triangular, termen bowed oblique, sinuate just above tornus; light pinkish-fuscous, striated with fuscous, towards costa and termen suffused with pale dull green, veins pale greenish marked with dark fuscous; median band hardly defined; a narrow dark fuscous spot preceding subterminal stria above tornus; cilia fuscous, base spotted with dark fuscous. Hind-wings moderate, termen rather unevenly rounded, sinuate above tornus; light grey, towards dorsum tinged with pale greenish and striated with dark fuscous irroration; a dark-grey roundish discal dot; cilia whitish-grey.

I am unacquainted with this species. The above particulars are taken from the original description.

CHLOROCLYSTIS CHARYBDIS.

(*Helastia charybdis*, Butl., Cist. Ent. ii., 503; *Helastia calida*, Cist. Ent. ii., 504.)

Allied to the preceding (i.e., to *indicataria* Walk.); primaries above smoky-grey crossed by about 8 zig-zag blackish lines in pairs, forming indications of four bands which are most strongly defined upon the costa; a white edged black binule between the last two bands; the last band partially filled in with sandy-whitish and brown; fringe whitish flesh-coloured intersected by a grey line and interrupted at the terminations of the veins by blackish spots; secondaries pale smoky-grey, the veins black spotted whitish; extreme outer margin black; fringe as in primaries; body brownish-grey, head yellowish; antennae smoky-grey, strongly pectinated; under surface sericeous grey; marking of upper surface ill-defined; discocellulars black; primaries with pale reddish cupreous costal area; secondaries with a series of short black dashes beyond the cell; fringe paler than the rest of the wings; spotted with dark grey. Expanse of wings 10 $\frac{1}{2}$ lines. Otago.

I am unacquainted with this species. The above is copied from the original description.

CHLOROCLYSTIS HEIGHWAYI.

(*Chloroclystis heighwayi*, Philp., Trans. N.Z. Inst., lviii., 705.)

This very obscure form was found by Messrs. W. Heighway and S. Lindsay at Pukeatua Bush, on the Lyttelton Hills, near Christchurch.

The expansion of the wings is $\frac{3}{4}$ inch. All the wings are of a neutral tint with very indefinite markings. The termen of the hind-wings is sinuate and the antennal ciliations are about 4.

The perfect insect appears in September.

Described from specimen submitted by Mr. Philpott.

CHLOROCLYSTIS DRYAS.

(*Pasiphila dryas*, Meyr., Trans. N.Z. Inst. xxiii., 97.)
(Plate XI, fig. 17 ♂. Plate I, fig. 39 larva.)

This species is fairly common in the neighbourhood of Wellington.

The expansion of the wings is 1 inch. The fore-wings are dull rosy-brown, traversed by numerous obscure blackish transverse lines, somewhat concentrated towards the middle and forming an ill-defined median band; the termen is slightly shaded with blackish, and the veins are marked with dotted lines. The hind-wings are grey, tinged with rosy-brown; there are numerous very faint blackish transverse lines and the veins are marked with blackish dots. The cilia of all the wings are dark grey. The termen of the hind-wings has rounded projections at veins 3 and 4.

The larva, which feeds on the leaves and blossoms of the common veronica (*Veronica salicifolia*), during the summer and early autumn, is about $\frac{3}{4}$ inch in length, much flattened with prominent lateral ridges; the head and segments 2, 3, and 4 are small, and the posterior segments are slightly attenuated; the general colour is dark reddish-brown tinged with purple on the ventral surface; there is an obscure yellowish lateral line and darker dorsal line. The head, legs and prolegs are bright orange-brown. This larva rests firmly grasping the foodplant, its body rigidly extended like a twig.

The pupa is enclosed in a very light cocoon of silk and refuse, on the surface of the ground.

The perfect insect appears from November till May, and is also occasionally observed in mid-winter. It is attracted by light.

CHLOROCLYSTIS ACOMPSEA.

(*Chloroclystis acompsea*, Prout, Trans. N.Z. Inst. lviii., 76; *Chloroclystis modesta*, Philp. (nec. Warren), Trans. N.Z. Inst., xlvii., 193.)

(Plate XV., fig. 19 ♂.)

This is rather an obscure species which has been found on Mount Egmont and Mount Ruapehu in the North Island and on Ben Lomond and Bold Peak, Lake Wakatipu, in the South Island, at altitudes of from 3,000 to 4,000 feet above the sea-level.

The expansion of the wings is about 1 inch. It is very like *Chloroclystis dryas* in almost every respect, apparently differing only in its slightly larger size, more acutely produced apex of fore-wings, and dark greyish-black colouring. There is hardly any trace of the warm pinkish-brown suffusion characteristic of *C. dryas*.

The perfect insect appears from December till February.

Described and figured from Mr. Philpott's specimens.

CHLOROCLYSTIS ARISTIAS.

(*Chloroclystis aristias*, Meyr., Trans. Ent. Soc. Lond. 1897, 385.)

(Plate XI., fig. 26 ♀, 27 ♂.)

This beautiful insect was discovered on the Mount Arthur Tableland at an elevation of about 4,000 feet. It has since occurred plentifully on Mount Egmont, at Duncedin and on Ben Lomond, Lake Wakatipu.

The expansion of the wings is $1\frac{1}{4}$ inches. All the wings are very pale greenish-grey. The male has three distinct dark brownish bands near the base, an irregular broad suffused band near the middle, becoming obsolete before it reaches the dorsum, a dark patch at the apex, another patch on the termen below the apex and another near the tornus. The hind-wings are

traversed by numerous, very fine, wavy blackish lines, becoming darker towards the dorsum. In the female there are three wavy reddish-brown bands on the costa of the fore-wings, becoming obsolete towards the dorsum, then a wavy yellowish line, followed by two rust-red patches. The hind-wings resemble those of the male. Both sexes have the veins dotted with black, and the cilia of all the wings are grey barred with black.

The perfect insect appears in December and January, and frequents sub-alpine forests. It is attracted by light.

CHLOROCLYSTIS FURVA.

(*Chloroclystis furva*, Philp., xlix., 239.)

(Plate XI., fig. 34 ♂.)

This dark-looking little species was discovered by Mr. Philpott on Mount Cleughearn at an altitude of about 2,300 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are dark grey heavily speckled with dull reddish; the markings are very indistinct; there is a wavy dull reddish subterminal band, partially bordered by a fine white line on its inner edge near the costa. The hind-wings are dark grey with a few whitish lines on the dorsum. The cilia of all the wings are greyish-ochreous barred with blackish-grey. The veins are dotted in black. The cilia of the antennae in the male are very long.

The perfect insect appears in January. It flies freely around *Veronica buxifolia* and other sub-alpine shrubs.

Described and figured from specimens kindly given to me by Mr. Philpott.

CHLOROCLYSTIS RUBELLA.

(*Chloroclystis rubella*, Philp., Trans. N.Z. Inst., xlvii., 193.)

(Plate XII., fig. 19 ♂.)

This large, very dark-looking species was discovered by Messrs. Fenwick and Oliver on Bold Peak, at the head of Lake Wakatipu. It has also occurred on Ben Lomond, and on the Lake Harris Saddle in the same district, as well as on the Hunter Mountains.

The expansion of the wings is almost $1\frac{1}{4}$ inches. The fore-wings are rather broad with the apex rounded and the termen very oblique, dark blackish grey strongly flushed with pinkish-ochreous; there is a dark basal patch, two distinct black edged sub-basal bands; no clear median band; a pale area above the tornus; an extensive cloudy shading on the apical and terminal area, with a paler somewhat crescentic mark below the costa; a bluish-white faint jagged subterminal line; the veins are dotted with black, partially ochreous in the disc. The hind-wings are pale grey heavily mottled with blackish-grey towards the body. The cilia of all the wings are pinkish-grey strongly barred with black. The female is considerably paler than the male with the veins more distinctly marked in ochreous-brown.

The perfect insect appears in December and January. It is found on the upper edge of the forest, at elevations of about 4,000 feet above the sea-level, and is attracted by the flowers of *Veronica buxifolia*.

CHLOROCLYSTIS ERRATICA.

(*Chloroclystis erratica*, Philp., Trans. N.Z. Inst., xlviii., 420.)

(Plate XI., fig. 35 ♂.)

This rather obscure species was discovered by Mr. C. C. Fenwick on Bold Peak, Lake Wakatipu. It has also

been taken by Mr. Philpott on Mount Cleughearn, Hunter Mountains, Southland.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings, which are rather elongate with the apex somewhat rounded and the termen obliquely bowed, are blackish-grey, slightly reddish tinged; the outer edge of the median band is outwardly oblique until below the middle of the termen where it has an obtuse double projection, below this the line bends sharply inwards then slightly outwards before it reaches the dorsum; there is a sub-terminal band of reddish-brown fainter towards the base; the terminal area is blackish traversed by a very fine wavy whitish subterminal line. The hind-wings are greyish-white, broadly clouded with blackish on the dorsum; there is the usual terminal series of fine black marks and the cilia of all the wings are blackish-grey faintly barred with darker.

The perfect insect appears in December. It evidently frequents veronica scrub on mountains in the far south at elevations of about 3,000 feet above the sea-level.

CHLOROCYSTIS HALIANTHES.

(*Chlorocystis halianthos*, Meyr., Trans. N.Z. Inst., xxxix., 107; *C. rufitincta*, Prout, Trans. N.Z. Inst., xli., 123.)

(Plate XII., fig. 17 ♂.)

This large but dull-looking species has occurred at Mactown, and on the mountains around Lake Wakatipu, at elevations between 3,000 and 4,000 feet above the sea-level.

The expansion of the wings is about 1 inch. The fore-wings are rather narrow with the apex rounded but somewhat produced and the termen slightly bowed near the middle and indented above the tornus, pale ochreous brown tinged with dusky purple; there is a large very pale blotch on the dorsum before the tornus; a narrow darker basal patch followed by a wavy dark-edged transverse band; the median band is broad traversed by many fine, very wavy brownish transverse lines; its outer edge is almost straight running from about three-quarters of the costa to the tornus with a slight projection outwards below the middle; there are several obscure brownish transverse lines on the subterminal area. The hind-wings are greyish with numerous faint transverse lines, darker on the dorsum.

This species is probably subject to considerable variation.

The perfect insect appears from November till February, and frequents the upper edges of the forest on the mountain sides.

CHLOROCYSTIS MAGNIMACULATA.

(*Chlorocystis magnimaculata*, Philp., Trans. N.Z. Inst. xlvii. 193.)

(Plate XI., fig. 33 ♀.)

This very distinct but extremely rare species has occurred on Mount Egmont, Mount Ruapehu, at the foot of Mount Cook, at Otira, on Flagstaff Hill, Dunedin, and at Queenstown, Lake Wakatipu.

The expansion of the wings is barely 1 inch. The fore-wings are very pale brownish-ochreous sometimes tinged with green; there is a dark brown shading on the costa at the base; a broad oblique bar before the middle and a smaller bar beyond the middle; there is a very large reddish-brown blotch at the

apex extending nearly half way down the termen and a small faint blotch at the tornus, the last containing a white mark; there are traces of a transverse band before the middle; several indistinct blackish marks on the veins and a very fine wavy sub-terminal line. The hind-wings, which have a blunt projection on the termen, are whitish-ochreous tinged with pale brown towards the dorsum where there are several dull brownish-black streaks. The cilia of all the wings are dull reddish-ochreous. The head and body are pale brownish-ochreous, the abdomen being barred with dark brown near base and apex.

The perfect insect appears from November till January, and may be looked for in scrubby forest, at elevations of from 1,000 to 3,500 feet above the sea-level.

Section C. antennae in male shortly and evenly ciliated.

CHLOROCYSTIS MALACHITA.

(*Chlorocystis malachita*, Meyr., Trans. N.Z. Inst., xlv., 25; *C. luminosa*, Philp., Trans. N.Z. Inst., xlvii., 192.)

(Plate XI., fig. 32 ♂.)

This very handsome and distinct species has occurred at Wellington, in the North Island, and in the Lake Wakatipu district in the South Island.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are bright moss-green; there is a series of faint blackish red bars on the costa; a large almost black blotch just before the apex; a larger trapezoidal blotch of blackish-red on the termen below the apex and another irregular rounded blotch at the tornus; there is a faint shaded transverse band before the middle; two fine curved white-edged black lines inside the terminal and tornal blotches, and a series of black crescentic marks on the termen; the cilia are red barred with black. The hind-wings are pale greyish shaded with pink towards the dorsum; there are numerous faint greyish transverse lines, strongest on the dorsum, and a series of black crescentic marks on the termen; the cilia are pink irregularly barred with black.

This species varies slightly in the depth of the ground colour which is sometimes yellowish; the blackish-red marks also vary in intensity.

The perfect insect appears in December and January, and is found in forest. It is usually a very rare species, although occasionally attracted by light.

CHLOROCYSTIS LICHENODES.

(*Pasiphila lichenodes*, Purdie, Trans. N.Z. Inst., xix., 70)

(Plate XI., figs. 29 and 30, varieties.)

This extremely interesting species has occurred at Raurimu, Waimarino and Wellington in the North Island, and at Mount Arthur, Otira, Dunedin and Invercargill in the South Island; it has also been found at Stewart Island.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are pale brown or dull green; there is always a large pale brown area near the base, divided by fine black lines into three distinct patches; the central portion of the wing is mottled with black, pale brown, and dull green; there is a very broad, irregular band of chocolate-brown near the termen, outlined with black towards the base and with white towards the termen, the white line almost dividing the band into four or five patches. The hind-wings are dull greenish-brown; there are several irregular black and white transverse lines and small patches of chocolate-brown,

the markings being more distinct towards the dorsum. The cilia of all the wings are pale brown barred with dark brown.

In most of the specimens of this species the ground colour is entirely pale brown instead of green; the markings, however, are not variable.

The perfect insect appears from November till February. It frequents forests, resting with outspread wings on lichen-covered tree-trunks, where its wonderfully perfect protective colouring may be seen to great advantage. The remarkable brown patches on the wings have undoubtedly been acquired for this protective purpose, and the insect's name is certainly a most appropriate one. It is not a common species.

CHLOROCLYSTIS FUMIPALPATA.

(*Eupithecia fumipalpata*, Feld., Reise der Novara, pl. cxxxi., 33;

Chloroclystis maculata, Huds., N.Z. Moths, 44, pl. vi., 18.)

(Plate XI., fig. 28 ♂.)

This very distinctly-marked species has occurred at Gisborne, Mount Ruapehu and Wellington in the North Island, and at Lyttelton, Otago, Queenstown and Bluff in the South Island.

The expansion of the wings is about $\frac{3}{4}$ inch. All the wings are creamy-white slightly tinged with warm brown or greenish-grey. The fore-wings have several irregular large black marks on the costa extending about two-thirds towards the apex; there is a curved transverse series of black dots at about two-thirds, and several irregular black marks on the termen near the middle and at the tornus. The termen of the hind-wings is irregular; there are numerous rows of black spots darkest near the dorsum. The cilia are cream-coloured strongly barred with black. All the wings have a wavy white subterminal line.

The perfect insect appears from December till February, and frequents forest. It is attracted by light, but is rarely met with.

CHLOROCLYSTIS SPHRAGITIS.

(*Pasiphila sphragitis*, Meyr., Trans. N.Z. Inst., xx., 51.)

(Plate XI., fig. 31 ♀; Plate I., fig. 36 larva.)

This delicate looking little species has occurred at Wellington in the North Island, and at Christchurch, Otago, Dunedin and Invercargill in the South Island.

The expansion of the wings of the male is $\frac{3}{4}$ inch, of the female $\frac{1}{2}$ inch. The fore-wings are pale ochreous; there is a narrow darker area at the base followed by a narrow oblique pale band; then a broad median band, formed of numerous oblique, wavy, brown, transverse lines and bordered with fine blackish lines strongest on the veins; there are several small irregular dark patches on the termen, and a faint wavy subterminal line; all the markings are much darker on the costa, and portions of the costa, termen, and dorsum are frequently tinged with green. The hind-wings are pale ochreous; there are numerous wavy, brown, lines on the dorsum, becoming obsolete towards the costa and a blackish central line thickened on the veins. The termen of all the wings is edged with fine black crescents. The cilia are pale ochreous barred with dark brown.

The remarkable larva (Plate I., fig. 36) which feeds on the flowers of *Mühlenbeckia*, is about $\frac{1}{2}$ inch in length, rather stout, tapering at each end, with all the segments

considerably indented and the skin much wrinkled transversely; green; the back of segments 2, 3 and 4 are dull reddish; segments 5, 6, 7, 8 and 9 have a red patch on each side, margined posteriorly and below with dark green; there are five conspicuous creamy-white semicircular dorsal markings, partially edged with dark green, on segments 5 to 9 inclusive; segment 10 is pale green, and the back of the rest of the segments dull reddish. The special colouring of this larva causes it to almost exactly resemble a short chain of the *Mühlenbeckia* blossoms and has evidently been expressly acquired for that purpose. The dark green and creamy-white markings are most deceptive and give the larva the appearance of having an irregular shape, whereas its actual shape is practically cylindrical. This larva is sluggish in its habits, mostly remaining concealed amongst the blossoms, but when walking its body is often gently swayed from side to side.

The pupa is enclosed in a rolled leaf.

The perfect insect may be met with from September till March, and is often locally abundant in the early spring. It is usually found in scrubby forest, where it rests with expanded wings on the leaves and stems of shrubs, but it is difficult to find in such situations, the general colouring of the insect causing it to closely resemble a bird dropping.

CHLOROCLYSTIS NEREIS.

(*Pasiphila nereis*, Meyr., Trans. N.Z. Inst., xx., 51; *Chloroclystis minima*, Huds., Trans. N.Z. Inst., xxxvii., 356.)

(Plate XI., fig. 16 ♀.)

This very dark-looking insect has occurred on Mount Ruapehu in the North Island and on Mount Arthur, Mount Hutt, Arthur's Pass, Macetown, Mount Earnslaw, the Humboldt Range, Lake Wakatipu, and the Hunter Mountains in the South Island, at elevations from 2,500 to 4,500 feet above the sea-level.

The expansion of the wings is nearly 1 inch. All the wings are blackish-grey with numerous black, dull white, and dull greenish-blue, wavy transverse lines, the markings on the hind-wings becoming faint or obsolete towards the costa; the cilia are dull white barred with greyish-black.

Varies considerably in size.

The perfect insect appears in January and February. It generally frequents cliffs on mountain sides, resting with outspread wings on the dark rock surfaces. In these situations it is extremely difficult to detect, and the protective value of its colouring is thus at once demonstrated. It flies freely in hot sunshine, about 5 p.m., resting now and again to suck honey from the *Celmisias*, *Veronicas* and other alpine flowers.

CHLOROCLYSTIS CLARKEI.

(*Chloroclystis clarkei*, Howes, Trans. N.Z. Inst., xlix., 274.)

(Plate XII., fig. 18 ♂.)

This very dark obscurely-marked species was discovered by Mr. C. E. Clarke on Flagstaff Hill, near Dunedin. It has also occurred on Ben Lomond, Lake Wakatipu.

The expansion of the wings is $1\frac{1}{2}$ inches. Apart from the antennal characters it is somewhat like *C. rubella* in general appearance but differs from that species in its duller colouring, absence of the cloudy pinkish or purplish blush, less rounded apex and much less oblique termen.

The perfect insect appears in February. It is fairly common on hills amongst *Dracophyllum*, *Leucopogon* and other shrubs.

Described and figured from a specimen kindly lent to me by Mr. Clarke.

CHLOROCYSTIS HUMILIS.

(*Chlorocystis humilis*, Philp., Trans. N.Z. Inst., xlix., 240.)

(Plate XI., fig. 9 ♀.)

This delicate-looking species was discovered by Mr. Pasco at Queenstown, Lake Wakatipu.

The expansion of the wings is $\frac{3}{4}$ inch. *All the wings are pale greyish-white with numerous very fine wavy dark grey markings*; there is a rather conspicuous series of black marks on the veins at about $\frac{2}{3}$ and a series of sharp black terminal crescents. The termen of the fore-wings is slightly bowed, that of the hind-wings sinuate. Although rather an obscure form this insect is quite distinct from any of the other species of *Chlorocystis*, having evenly ciliated antennae in the male.

The perfect insect appears in November.

Described and figured from a specimen in the Pasco collection.

CHLOROCYSTIS SUFFUSA, n. sp.

(Plate XII., fig. 16 ♀.)

This large and conspicuous species was discovered by Mr. Morris N. Watt on Mount Egmont, at an altitude of about 3,000 feet above the sea-level.

The expansion of the wings is 1 inch. The fore-wings are rather dark grey; there is a black-edged reddish-grey basal patch, a paler sub-basal area; *the inner edge of the median band is broadly edged with blackish-brown; there is a broad black sub-costal patch reaching from the inner to the outer edge of the median band*; a warm brown subterminal band, finely edged with green towards the base and a series of blackish terminal marks. The hind-wings are rather dark grey, slightly tinged with reddish towards the dorsum where there are several blackish transverse lines. The cilia of all the wings are pinkish-grey barred with blackish.

The perfect insect appears in January.

Genus 6.—EUCYMATOGE, Hübner.

Face with cone of scales. Antennae in ♂ ciliated. Palpi moderate, rough-scaled. Abdomen with slight crests throughout. Fore-wings: areole double. Hind-wings normal.

A genus of moderate extent and general distribution, with the interesting feature of special development in the Hawaiian Islands. There are three New Zealand species.

The markings on both fore- and hind-wings are specially adapted for disguise, whilst the insects are resting, with outspread wings, on tree-trunks.

EUCYMATOGE ARENOSA.

(*Eucymatoge arenosus*, Howes, Trans. N.Z. Inst. xliii., 127, pl. 1. 2.)

(Plate XII., fig. 20 ♂.)

This rather pale-coloured little species was discovered by Mr. W. G. Howes at Titahi Bay, on the northern shore of Cook Strait. It has also occurred at Moeraki, near Oamaru.

The expansion of the wings is $1\frac{1}{2}$ inches. *All the wings are pale ochreous traversed by numerous fine oblique brownish-ochreous transverse lines*; there is an indistinct blackish line from the apex of the fore-wings to the middle of the dorsum and a fine black line on the hind-wings below the middle. *All the veins are sharply dotted in black.*

The perfect insect appears from November till March. It is attracted by sugar, blossoms and light.

Described and figured from a specimen in the Dominion Museum.

EUCYMATOGE GOBIATA.

(*Cidaria gobiata*, Feld. Reis. Nov., pl. cxxxi. 2. *Phibalapteryx simulans*, Butl., Cist. Ent. ii. 506. *Phibalapteryx unduligera*, ib. 506. *Phibalapteryx rivularis*, ib. 507. *Scotosia gobiata*, Meyr., Trans. N.Z. Inst. xvi. 70. *Cephalissa gobiata*, ib. xviii. 184.)

(Plate XII., fig. 21; Plate I., fig. 45, larva.)

This species has occurred at Auckland, Waimarino and Wellington in the North Island, but is not a very common insect. In the South Island it has occurred at Christchurch, and is generally distributed throughout Otago and Southland.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings, which have the costa rather strongly arched and the termen slightly oblique, are very pale purplish-grey with dark brown and pale reddish-brown markings; there are two very oblique, wavy, dark brown transverse lines on the dorsum at about $\frac{2}{3}$ and $\frac{1}{3}$ which reach a little more than half way to the costa; between these two lines there are several fainter reddish-brown lines; *a very conspicuous oblique line runs from the apex to the middle of dorsum*; this line is double near the middle of its course where it encloses a small oval space; on either side of this oblique line there are numerous paler brown wavy lines which become considerably stronger and more reddish towards the termen; all the veins are dotted in brown. The hind-wings are very pale purplish-grey with a strong wavy dark brown transverse line below the middle and numerous fine paler brown transverse lines, redder towards the termen; all these lines fade away towards the costa. The head thorax and abdomen are pale purplish grey with brown transverse markings which correspond to a great extent with the lines on the fore- and hind-wings.

The larva, which feeds on *Coprosma arcolata* during the summer months, is about 1 inch in length, moderately stout, slightly attenuated at each end; pale dull brownish-green obscurely streaked and mottled with pale reddish-brown and blackish; there are two very large humps on segments 8 and 9; the skin is considerably wrinkled with a few scattered short bristles. This larva is of sluggish habits and very well adapted for concealment amongst the twigs of its foodplant.

The perfect insect appears from October till April, frequenting wind-swept scrubby hill tops, where its food-plant is often abundant. There are probably two complete broods in a season, the moth apparently passing the winter as a larva.

EUCYMATOGE ANGULIGERA.

(*Phibalapteryx anguligera*, Butl., Cist. Ent. ii. 506; *Eucymatoge anguligera*, Meyr., Trans. N.Z. Inst., xii. 5; *Hydriomena gobiata*, Huds., N.Z. Moths, 47, pl. vi. 43.)

(Plate XII., fig. 22 ♂, 23 ♀; Plate I., fig. 46 larva.)

This species has occurred at Auckland and Wellington in the North Island, and at Otira, Dunedin and Invercargill in the South Island.

The expansion of the wings is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. Distinguished from *E. gobiata* by the much more strongly waved termen of both fore- and hind-wings, slightly larger size, pronounced blunt projection in middle of outer edge of median band, and the marked pink flush of the undersides. In many specimens the dorsal portions of the fore-wings and the basal and terminal areas of the hind-wings are clouded with reddish-brown or dark chocolate brown. There is also considerable variation in the depth and strength of the transverse lines and ground colour and in some specimens all the markings are extremely faint, the pale ochreous-brown ground colour predominating. faint, the pale ochreous-brown ground colour predominating during the summer months, is about $1\frac{1}{4}$ inches in length, elongate with the posterior segments considerably stouter; dull greyish or greenish-ochreous; there is an irregular blackish swelling on segment 3 and two larger swellings on segments 8 and 9. Younger larvae are much more slender and also darker in colour. This caterpillar is of very sluggish habits resting motionless on its food-plant for many hours at a time. It very closely resembles a twig, the black swellings suggesting small lichens. The pupa state is spent amongst rubbish on the surface of the ground, often without any protective cocoon.

The perfect insect appears from September till March. It is found in scrubby forest, where it may occasionally be dislodged by beating, but is more often taken on the flowers of the common veronica (*V. salicifolia*) in the evening. It may also be found resting on tree-trunks and fences, in the daytime.

Genus 7.—HYDRIOMENA, Hübn.

Face with cone of scales. Antennae in ♂ ciliated. Palpi moderate, rough-scaled. Abdomen sometimes crested on two basal segments. Fore-wings: areole double. Hind-wings normal. (Plate C., fig. 32 head, figs. 33 and 34 neurulation of *Hydriomena deltoidata*.)

A very large genus, dominant in almost all regions, and extensively developed in Australia, but comparatively much less important in New Zealand where there are sixteen known species. Of these one is confined to the North Island; six to the South Island; eight common to both islands, and one restricted to the Chatham Islands.

HYDRIOMENA SIRIA.

(*Cephalissa siria*, Meyr., Trans. N.Z. Inst. xvi. 93.)

(Plate XI., fig. 45 ♂.)

This odd little species was discovered by Captain Hutton at Dunedin. Since then it has been rediscovered by Mr. C. E. Clarke in the same locality, and has also occurred in the Waihopai Scenic Reserve, near Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are rich brown with the basal patch and median band darker brown, partially edged with dull whitish-ochreous; the median band is moderately waved, and considerably broader on the costa. The hind-wings are bright orange. The termen of the fore-wings is slightly excavated below the apex, and bowed a little below the middle.

The perfect insect appears in October and November, frequenting low lying Kahikatea forest, amongst sedge (*Carex*). It flies like a *Chrysophanus* and is shy and hard to capture.

Described and figured from specimens kindly given to me by Mr. Philpott.

HYDRIOMENA TRIPHLAGMA.

(*Cidaria triphragma*, Meyr., Trans. N.Z. Inst., xvi., 74; *Asaphodes siris*, Hawth., Trans. N.Z. Inst., xxix., 283; Huds., N.Z. Moths, 55, pl. vii., 16.)

(Plate XII., fig. 40 ♂.)

This very distinctly-marked little species has occurred at Cape Terawhiti, near Wellington, in the North Island, and at Blenheim and on the Otago Peninsula in the South Island.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings, which have the apex projecting and the termen strongly bowed, are very pale purplish-ochreous; or purplish-grey; there is a darker basal patch with its outer edge dark brown and strongly convex; a dark brown strongly curved transverse line is situated before one-third and another transverse line at two-thirds; the second line has a strong angular projection in the middle; all these darker markings are finely edged with whitish. The hind-wings are pale ochreous or purplish-ochreous, darker on basal half; there is a faint curved median line.

The perfect insect appears in September and October, and again in March. It seems to be attached to the sea-coast, but is evidently a very local species.

I am indebted to Messrs. Clarke and Hawthorne for specimens.

HYDRIOMENA EXPOLITA.

(*Hydriomena expolita*, Philp., Trans. N.Z. Inst., xlix., 240.)

(Plate XII., fig. 42 ♂.)

This very distinctly-marked species was discovered by Mr. J. H. Lewis at Broken River, Canterbury, and has been taken by Mr. W. Heighway at Mount Grey.

The expansion of the wings is about $1\frac{1}{4}$ inches. Although very similar to *Hydriomena triphragma* it may be easily distinguished from that species by its larger size, the much more pro-

minent and double projection on the outer margin of the median band, the conspicuous dark sub-apical streak and much greyer hind-wings.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

HYDRIOMENA PURPURIFERA.

(*Cidaria purpurifera*, Fer., N.Z. Journ. Sci. i., 531; Trans. N.Z. Inst. xvi., 119; Meyr., ib. 75.)

(Plate XII, fig. 45 ♀.)

This very beautiful insect has been taken in the North Island at Mount Egmont and Ohakune, and in the South Island at Mount Arthur, Mount Hutt, Castle Hill, Otira, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is from 1 to 1½ inches. The fore-wings are rather bright green; there is a darker area near the base, a very broad purplish-brown central band, with a large square projection on the middle of its outer edge; above this projection there is a very conspicuous white mark, bordering the central band; the remainder of the wing is green; there is a wavy white subterminal line, and an oblique bluish-black mark near the apex. The hind-wings are pale brownish-ochreous.

Varies slightly in the depth and intensity of the colouring. The hind-wings range from ochreous-brown to whitish-ochreous.

This species is closely allied to *Hydriomena rixata*, but easily distinguished by its brighter green colouring, purplish central band with square projection, and broad white marking beyond the central band.

The perfect insect appears in December and January, and frequents forest at elevations of from 1,000 to 3,000 feet. It is found in drier situations than the next species, and is not confined to forest streams. It is attracted by blossoms, and, although common in certain localities, is not nearly so generally distributed as *Hydriomena rixata*.

This insect rests on tree-trunks with its wings half extended, the fore-wings covering the hind-wings and the tip of the abdomen elevated. In this position it resembles a moderate-sized lichen.

HYDRIOMENA RIXATA.

(*Cidaria rixata*, Feld., pl. cxxxii. 1; Meyr., Trans. N.Z. Inst., xvi., 75. *Coremia squalida*, Butl., Cist. Ent. ii., 505.)

(Plate XII, fig. 43 ♂ North Island form; 44 ♂ South Island form.)

This pretty insect is very common, and generally distributed throughout the country.

The expansion of the wings is about 1 inch. The fore-wings have a dull green patch near the base, with numerous dull brown and dull white transverse lines; there is a very broad blackish-brown central band paler in the middle, but almost black at the edges; this band has a large rounded projection on its outer edge near the middle, and below this projection it is deeply indented; the remainder of the wing is dull yellowish-green with several brown and white transverse lines; one of the white lines is more conspicuous than the rest and very wavy; there is a shaded oblique black mark from the apex. The hind-wings

are very pale ochreous-brown; there are a few obscure brownish transverse lines near the dorsum and a terminal series of faint crescentic marks.

Specimens from the South Island are very much duller in colour than those from the North Island, and the hind-wings of the southern form are grey in place of ochreous-brown, but beyond this there are no important variations.

The perfect insect appears in December and January, and frequents the overhanging banks of streams in densely wooded ravines, where it often occurs in the utmost profusion.

HYDRIOMENA SIMILATA.

(*Cidaria similata*, Walk., Cat. xxv., 1413. *Cidaria timarata*, Feld. pl. cxxxii. 19. *Cidaria similata*, Meyr., Trans. N.Z. Inst., xvi., 76.)

(Plate XII, fig. 46 ♂; Plate II, fig. 2 larva.)

This beautiful species has occurred at Napier, Waimarino, and Wellington in the North Island, and at Christchurch, Otira, Dunedin, Lake Wakatipu and Invercargill in the South Island. It has also been taken at Stewart Island and in the Chatham Islands.

The expansion of the wings is 1½ inches. The fore-wings are dark greyish-brown or purplish-brown, with the veins and margins broadly marked with bright green; there are numerous irregular wavy blackish streaks forming three very ill-defined darker transverse bands; the first at the base; the second from about one-fourth to two-thirds, usually with a paler central area; and the third near the termen outwardly edged with white. There is a series of fine black terminal marks and the cilia are dark brown. The hind-wings are cream-coloured tinged with very pale reddish-brown, darker towards the dorsum, with numerous pale brown wavy transverse lines. There is a series of black crescentic marks on the termen, and the cilia are pale reddish-brown.

This species is rather variable. The spaces between the darker bands on the fore-wings are usually green, but in some specimens this is partially replaced by pale purplish brown. In one very striking variety from the extreme south the median band is wholly black.

The larva, which feeds on *Coprosma robusta* and *C. rotundifolia*, is about 1 inch in length, rather stout, slightly attenuated at each end; dull brown thickly speckled and streaked with blackish; the central portions of the three thoracic segments are green as well as a series of prominent dorsal ridges situated on the posterior margins of the other segments; the spiracles are black margined with white and the legs and prolegs pale green. Younger larvae have the dorsal ridges much less conspicuous, and whitish tubercles are often situated on segments 7, 8, 9 and 10. This caterpillar is extremely hard to detect, when resting motionless amongst its foodplant, as it so closely resembles a small mossy twig. It may be found throughout the whole of the summer, and, as half-grown specimens also occur in the early spring, it is evident that the species passes the winter in the larval condition.

The pupa is enclosed in a thin cocoon, constructed of silk and refuse, situated on the surface of the ground.

The perfect insect appears from September till April, and frequents scrubby forest. It is generally found resting on moss-covered tree-trunks, where its green and brown colouring is highly protective.

HYDRIOMENA CALLICHLORA.

(*Cidaria callichlora*, Butl., Cist. Ent. ii., 509; Meyr., Trans. N.Z. Inst., xvi., 76; *Hydriomena praeurupta*, Philp., ib., i., 125.)

(Plate XII., fig. 47 ♀; 48 ♂ Mountain form; Plate XLVIII., fig. 19, variety; Plate II., fig. 3 larva.)

This very beautiful insect has occurred at Waimarino and Wellington in the North Island, and at Christchurch, Otira, Dunedin and Invercargill in the South Island.

The expansion of the wings is about 1 inch. The fore-wings are bright green with numerous blackish or dark brown wavy transverse lines; these form a distinct basal patch and a wide, strongly indented, median band which contains a black discal dot; there are several brownish or blackish patches on the terminal area traversed by a fine wavy green subterminal line; the veins are sharply dotted in black. The hind-wings are very pale greyish-white with several very faint wavy transverse lines. All the wings are margined with a series of black crescentic markings and the cilia are greyish-green.

This species varies slightly in the intensity of the median band and other markings. These are, however, much more distinct than in *H. similata* and the absence of any reddish-brown colouring on the hind-wings is also a good character. The green colouring of *H. callichlora* is always much brighter than in *H. similata*.

A variety of this species, sometimes found in mountainous regions, having a paler apical patch, slightly more dentate subterminal line and stronger projection on the posterior margin of the median band, has been described by Mr. Philpott under the name of *Hydriomena praeurupta*. (Plate XII., fig. 48.) Another very remarkable variety, in Mr. Clarke's collection, is figured on Plate XLVIII., fig. 19.*

The very handsome larva, which feeds on *Coprosma rotundifolia*, during the summer months, is about 1 inch in length, moderately slender, slightly flattened and of almost uniform thickness; very bright green much paler on the ventral surface; there is a conspicuous crimson lateral line sometimes edged with white and the prolegs are also crimson; the segmental divisions are marked in yellow, and there are a few isolated black bristles. Younger larvae have the ground colour dull greyish-green, whitish underneath, and the crimson stripe is much fainter than in the full-grown larva.

The pupa is enclosed in a fragile cocoon composed of several leaves joined together with silk and usually situated on the surface of the ground.

The perfect insect appears from November till March. It is very local frequenting restricted areas, usually on

wind swept scrubby hill tops, where its foodplant is often abundant. It rests on mossy tree-trunks with the fore-wings folded back and the end of the abdomen curled upwards; this, together with the thoracic crests, greatly increases the insect's resemblance to a patch of moss. Although larvae of all ages are to be found feeding during the summer, it appears probable that the species spends the winter either as a full-grown hibernating larva, or as a pupa.

HYDRIOMENA ARIDA.

(*Melanthia arida*, Butl., Cist. Ent. ii., 509; *Cidaria chaotica*, Meyr., Trans. N.Z. Inst., xvi., 76. *Cidaria arida*, Meyr., ib., xvii., 64.)

(Plate XII., figs. 33, 34, varieties.)

This very dark-looking species has occurred in the South Island at Picton, Nelson, Akaroa, Mount Hutt, Arthur's Pass, Otira, Dunedin, Lake Wakatipu and Invercargill. It also occurs on Stewart Island.

The expansion of the wings is 1½ inches. The fore-wings are dark blackish-grey; there are two small cream-coloured patches on the costa at $\frac{1}{2}$ and $\frac{3}{4}$ continued across the wing as two curved series of small cream-coloured spots; there is a subterminal series of whitish dots. In most specimens there is a very broad paler brown median band with a rounded projection below the middle almost touching the termen; this band is traversed by numerous fine wavy dark brown transverse lines and contains a conspicuous discal dot. The hind-wings are very pale brownish-grey or creamy-grey; all the cilia are nearly black.

This species is at once recognisable by the very dark colouring of the fore-wings and very broad, usually paler, median band.

The perfect insect appears from December till February, and is found in forests, between 1,500 and 3,000 feet above the sea-level, but is not a common species.

HYDRIOMENA HEMIZONA.

(*Hydriomena hemizona*, Meyr., Trans. Ent. Soc. Lond. 1897, 385.)

(Plate XII., fig. 35 ♂, 36 ♀.)

This rather obscure-looking species has occurred at Waimarino, Mount Egmont, Mount Holdsworth and Cape Terawhiti in the North Island, and at Mount Arthur, Otira, Waitati, the Routeburn Valley, Lake Wakatipu, Longwood Range, and the Hunter Mountains in the South Island.

The expansion of the wings is about 1½ inches. All the wings are very glossy with slight bronzy reflections; the fore-wings are bronzy-brown with numerous wavy blackish transverse lines sometimes forming a fairly distinct median band which, however, is more often merged with the basal patch; the outer edge of the median band has a large rounded projection and is often edged with white near the costa, it is rarely followed by an obscure reddish-brown wavy streak; an indistinct subterminal line is usually present. The hind-wings are pale bronzy-grey. The female is usually slightly larger and paler than the male.

*Sub-species *harmonica*, Clarke, Trans. N.Z. Inst., lvi., 417.

This species somewhat resembles *Hydriomena deltoidea*. It is, however, a less robust-looking insect, and the transverse lines in *H. deltoidea* are always much straighter than in *H. hemizona*.

The perfect insect appears from December till February, and frequents beech forests, usually at elevations of 3,000 feet above the sea-level. As a rule it is a rare species, but is sometimes quite common in the Routeburn Valley beyond the head of Lake Wakatipu. Mr. Philpott informs me that it occurs in the utmost profusion on the Hunter Mountains.

HYDRIOMENA HAEMOPHAEA.

(*Hydriomena haemophaea*, Meyr., Records of Canterbury Museum (N.Z.) ii., 5, 270.)

(Plate XLVIII., fig. 20 ♂.)

A single specimen of this species, in rather poor condition, was taken by Mr. C. Lindsay, at Whangamarino, Chatham Islands.

The expansion of the wings is fully $1\frac{1}{2}$ inches. The fore-wings are reddish-brown, of somewhat variable intensity; basal area slightly clouded with blackish on costa; sub-basal patch irregularly clouded with dull reddish, becoming dull ochreous near costa; inner edge of median band marked by a fine reddish-brown line, with two acute angulations towards termen; a distinct black discal dot at apex of costal angulation; median band with a few cloudy blackish transverse lines; outer edge of median band outlined in ochreous, with two rounded projections near middle, these being clouded with very bright reddish-brown; terminal and subterminal areas deep reddish-brown, paler towards median band; a cloudy blackish subterminal band; veins on terminal third obscurely marked in dusky-brown; a very conspicuous ochreous apical patch. The hind-wings are ochreous, clouded with pale reddish-brown towards termen, with a series of brownish subterminal spots.

The perfect insect appears in December.

Described and figured from the unique specimen in the Canterbury Museum, kindly lent to me by Professor Speight.

HYDRIOMENA CANESCENS.

(*Hydriomena canescens*, Philp., Trans. N.Z. Inst., i., 125.)

(Plate XII., fig. 41 ♂.)

This rather dull "peppered-looking" insect was discovered, by the late Mr. M. O. Pasco, at Queenstown, Lake Wakatipu.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are greyish-white heavily sprinkled with dark grey scales especially on the basal patch, median band and terminal area; the first line runs abruptly outwards on the costa, thence obliquely inwards; the second line is very wavy and strongly curved inwards below the middle; the sub-basal and subterminal areas have several obscure ochreous marks; the veins are dotted with black and dull white. The hind-wings are greyish-white peppered with darker grey and with numerous very obscure dull grey and dusky-ochreous transverse lines, all of which are stronger on the dorsum.

This species somewhat resembles *Hydriomena hemizona*, but lacks the bronzy look of that species. It is also considerably smaller and has much more distinct markings on the hind-wings.

The perfect insect appears in March.

Described and figured from the unique specimen kindly lent to me by Mr. Philpott.

HYDRIOMENA DELTOIDATA.

(*Coremia deltoidea*, Walk. Cat. xxv., 1321. *Cidaria inclarata*, Walk. Cat. xxv., 1411. *Cidaria perductata*, ib., 1412. *Cidaria congressata*, ib., 1412. *Cidaria conversata*, ib., 1413. *Cidaria descriptata*, ib., 1414. *Cidaria bisignata*, ib., 1415. *Cidaria aggregata*, ib., 1415. *Cidaria congregata*, ib., 1415. *Cidaria plagifuscata*, ib., 1416. *Coremia pastinaria*, Gn., E. M. M. v. 64. *Cidaria inopiata*, Feld. Reis Nov. pl. cxxxii. 3. *Cidaria monoliata*, Feld. ib., 8. *Cidaria perversata*, Feld. ib., 14, 24. *Scotosia deltoidea*, Meyr., Trans. N.Z. Inst. xvi., 70. *Cephalissa deltoidea*, Meyr., Trans. N.Z. Inst. xviii., 184.)

(Plate XII., figs. 24 to 28, varieties; Frontispiece fig. 12 egg; Plate II., fig. 40 larva.)

This pretty insect is extremely abundant throughout the country. It also occurs on Stewart Island and on the Chatham Islands.

The expansion of the wings varies from $1\frac{1}{2}$ to $1\frac{1}{4}$ inches. The fore-wings vary from brownish-black to dull orange-brown; there is a small darker area near the base, followed by two whitish wavy transverse lines, then a broad darker central band, often containing within it a narrower band, bounded by two wavy black transverse lines; beyond the central band there are nearly always two or three pale brown or whitish lines, an interrupted subterminal line, and a short oblique whitish line below the apex; there is a black discal dot and a white dot on the termen near the middle. The hind-wings are yellowish-brown, with several wavy, transverse lines near the dorsum; there is a series of fine crescentic black lines on the termen of both fore- and hind-wings.

This species is extremely variable, especially in the depth of the ground colour both in the fore- and hind-wings. One very striking variety occasionally met with has the central band of the fore-wing completely divided in the middle, which thus forms two dark patches, one on the costa, and one on the dorsum. (See Plate XII., figs. 24 and 26.) A further development of this variety has only the costal patch present, the whole of the lower portions of the band being completely obsolete. The minor varieties are too numerous to specify. Generally speaking specimens from the northern portions of the North Island are larger and more vividly marked than those taken elsewhere.

The eggs, which are deposited loose on the leaves of *Plantago* in the early autumn are very small, about one-sixtieth of an inch in length, elliptical-globose, whitish, covered with large, shallow hexagonal depressions.

The young larva, when about ten days old, is elongate-cylindrical with the anterior segments considerably swollen and the ventral and anal prolegs extremely close together;

pale greyish-ochreous with many pale wavy brownish-ochreous lines; there are two rows of black warts with a short stout black bristle on each wart. It feeds on the soft green portions of the leaf close to the ground, and is evidently very sluggish and secretive in its habits. Later on the larvae become dull brownish-grey, and at this stage they very frequently rest standing on their prolegs with the anterior segments curled up. In this position the larva has a very striking resemblance to the small brownish-grey fungi which grow so profusely on old sticks or palings lying on the ground during the winter months, and the value of this protective resemblance is therefore evident.

The full-grown larva is about 1 inch in length, rather flattened and slightly tapering towards each end; sooty black with a broad brownish lateral stripe and one or two very obscure fine subdorsal lines; there are two whitish warts on the subdorsal regions of segments 4 to 12, each wart giving rise to a short black bristle; the spiracles are jet black. The larva varies considerably in the depth of its colouring, some individuals being almost entirely black with the lateral stripe hardly visible. It feeds at night on *Plantago* and probably other low plants, secreting itself during the daytime amongst the stalks. This larva lives through the whole winter and is most active on warm wet nights. It is full-grown about the end of August.

The pupa is rather elongate, slightly dilated towards the lower end of the wing-cases, pale yellowish-brown. It is concealed in the earth near the roots of the foodplant.

The perfect insect appears from the beginning of January until the middle or end of March. It is most abundant on the edges of forest or amongst open scrub. Some forty years ago it appeared every summer in such enormous numbers that it was a perfect pest to the collector but, except in a few restricted localities far removed from settlement, its numbers have long since been greatly reduced. It is freely attracted by blossoms, sugar and light.

HYDRIOMENA PRIONOTA.

(*Arsinoe prionota*, Meyr., Trans. N.Z. Inst. xvi., 73. *Anachloris prionota*, ib., xviii., 184.)

(Plate XLVIII., figs. 29 ♂, 30 ♀.)

This species has occurred in the South Island at Goulard Downs, Castle Hill and Dunedin.

The fore-wings, which have the termen rounded and slightly scalloped, are pale ochreous-brown with numerous dentate, dark brown transverse lines; in the male the costa and termen are often clouded with dull light green; there is a broad median band indistinctly clouded with brown, hardly perceptible in the female; the lines forming its outer edge are bent in the middle into a rather strong indented projection; in the male there is a cloudy dark brown subterminal line. The hind-wings are ochreous-whitish, with the termen strongly scalloped and the cilia reddish-brown; there are several incomplete transverse lines on the dorsum.

Probably variable.

There has been considerable confusion between this species and *Xanthorhoe cedrinodes* from which however it may be at once distinguished by the entire absence of antennal pectinations.

The description has been taken from the original by Mr. Meyrick, and the figures from two specimens lent to me by Mr. Grimmer.

HYDRIOMENA SUBOCHRARIA.

(*Aspilates* (?) *subochraria*, Dbl., Diess. N.Z. ii., 285. *Camptogramma subochraria*, Butl., Cat. Lep. N.Z., pl., iii., 16. *Camptogramma strangulata*, Gn. Lep., x., 423. *Camptogramma fuscinata*, Gn., El. M. M. v., 92. *Arsinoe subochraria*, Meyr., Trans. N.Z. Inst. xvi., 73; Meyr., Proc. Linn. Soc. N.S.W., 1890, 851; *Aspilates cubollaria*, Walk., Cat. xxvi., 1684.)

(Plate XII., fig. 37 ♂.)

This species is fairly common and generally distributed throughout the country. It also occurs on Stewart Island and on the Chatham Islands.

The expansion of the wings is about 1½ inches. The fore-wings are bright ochreous-yellow; there is a black dot a little above the middle, and an oblique dark purplish-brown transverse band at about three-fourths; the termen is shaded with purplish-brown. The hind-wings are ochreous, with a very obscure central transverse line.

A variety (*Hydriomena fuscinata*, Gn.) sometimes occurs in which the whole of the wings are more or less tinged with purplish-brown.

The perfect insect appears from November till April. It chiefly frequents tussock country and swampy situations. In the Wellington district it is extremely abundant in the clearings at the foot of the Taranaki Range. The typical form is common in Australia and Tasmania.

HYDRIOMENA SUBRECTARIA.

(*Coremia subrectaria*, Guen., Phal. x., 411; *Cidaria responsata*, Walk., Cat. xxv., 1409; *Melanthia casta*, Butl., Cist. Ent. ii., 553; *Hydriomena subrectaria*, Meyr., Proc. Linn. Soc. N.S.W., 1890, 829.)

(Plate XIII., fig. 31 ♀.)

This species was discovered at Queenstown, Lake Wakatipu by the late Mr. M. O. Pasco. It has also occurred on the Lyttelton Hills, near Christchurch.

The expansion of the wings is almost 1 inch. The fore-wings are greyish-ochreous very slightly tinged with pinkish and irregularly clouded and speckled with blackish-brown; the median band is blackish-brown margined with perfectly straight ochreous lines; there is a dark apical patch and a very wavy white subterminal line. The hind-wings are grey with two very regularly wavy transverse lines.

The perfect insect appears from November till March. This species is common and widely distributed in south-eastern Australia, which is doubtless its home.

Described and figured from the specimen in Mr. Pasco's collection.

HYDRIOMENA LITHURGA.

(*Hydriomena lithurga*, Meyr., Trans. N.Z. Inst., xliii., 71.)

(Plate XII., fig. 39 ♂.)

This very distinctly-marked species was discovered by Mr. R. M. Sunley, at Makara, near Wellington. It has since occurred near Sinclair Head.

The expansion of the wings is slightly over 1 inch. The fore-wings, which have the termen slightly waved and oblique, are pale greyish-ochreous with the basal patch and median band clouded with brown; the edge of the basal patch is finely margined with black and has a prominent projection just below the costa; the median band is broad on the costa, narrow on the dorsum with a rounded projection on its outer edge above the middle; except near the costa its margins, which are strongly toothed, are finely outlined first with black and then with white; there is an elongate black discal dot near the first line; a distinct pale apical patch and a wavy greyish subterminal line; the veins are faintly dotted with grey and whitish. The hind-wings are whitish-ochreous; there are several very faint greyish transverse lines, darkest on the dorsum, and a dusky discal dot. All the wings are margined with a very fine wavy blackish line and the cilia are pale ochreous barred with dusky grey.

The pupa is enclosed in a loose cocoon amongst *Mühlenbeckia* on which the larva probably feeds.

The perfect insect appears in October and November, and is apparently attached to the sea-coast.

Described and figured from a specimen in Mr. Sunley's collection.

Genus 8.—ASTHENA Hübner.

Face smooth, flat. Antennae in ♂ ciliated. Palpi short, slender, loosely scaled. Fore-wings: areole double. Hind-wings normal.

(Plate C. figs. 30, 31 neuration of *Asthena pulchra*.)

A small genus of wide distribution; the three New Zealand species are of Australian type.

ASTHENA PULCHRARIA.

(*Acidalia pulchra*, Dbld., Dieff. N.Z. ii., 286; *Chlorochroma plurilineata*, Walk., Cat. xxii., 563, 676; *Asthena ordinata*, Gn., Lep. ix., 438, pl. xix., 4; Butl., Cat. N.Z. Lep. pl. iii., 20; *Cidaria ordinata*, Feld., Reis. Nov. pl. cxxviii., 17; *Asthena pulchra*, Meyr., Trans. N.Z. Inst. xvi., 69; Meyr. Proc. Linn. Soc. N.S.W., 1890, 813.)

(Plate XII., fig. 29 ♂, 30 ♀.)

This beautiful little insect has occurred at many localities throughout both the North and South Islands. It is probably a common species in most wooded districts.

The expansion of the wings is almost an inch. All the wings are very pale greenish-white with numerous faint green, wavy, transverse lines. The fore-wings have a more or less distinct brown band on the costal edge, and a conspicuous black discal dot. The hind-wings often have a slight projection on the termen near the middle.

The larva, which feeds on *Leucopogon fasciculatus* is about $\frac{1}{2}$ inch in length, rather stout, of fairly even thickness with the segmental divisions moderately excised; green; usually with a very broad chocolate-brown dorsal

band containing three slightly darker lines; there is an indistinct yellowish-white lateral line, and a broad reddish-edged brown stripe on each side of the head. It chiefly eats the flowers of its foodplant and the brown dorsal band is exactly imitative of the stem.

The perfect insect appears from October till May, and is fairly common in open forests on hills, where its foodplant thrives in profusion. There are two broods in the season. It is also common and widely distributed in Australia and Tasmania.

ASTHENA SUBPURPUREATA.

(*Asthena subpurpureata*, Walk., Cat., xxvi., 1588; *Acidalia tuhata*, Feld., Reis. Nov. pl. cxxviii., 5; *Astheniodes polymaria*, Hamp., Journ. Bomb. Nat. Hist. Soc., xiv, 648.)

(Plate XII., fig. 31 ♂, 32 ♀; Plate I., fig. 47 larva.)

This pretty insect seems to be very common and generally distributed throughout the country wherever the manuka (*Leptospermum*) grows in profusion.

The expansion of the wings is about 1 inch. The fore-wings have the apex very acute and the hind-wings have the termen angled and bluntly toothed in the middle; all the wings are pale purplish-slate colour of very variable intensity, some specimens being almost white; there is a darker discal dot in both fore- and hind-wings and numerous fine wavy pale transverse lines, except on a rather narrow median band where the ground colour is usually darker and, in pale coloured specimens, sometimes almost entirely filled in with warm brown; the costa is narrowly edged with brown and there is a series of minute dark greyish terminal dots. The claspers of the male are much larger than in the closely allied *Asthena schistaria*.

The larva, which feeds on manuka (*Leptospermum scoparium* and *L. ericoides*), is about $\frac{1}{2}$ inch in length, cylindrical, of fairly even thickness, but slightly attenuated posteriorly; the head is pale yellowish-brown with a dark brown patch on each side; the body is bright green; there is a narrow blackish dorsal line; a very broad pink and white lateral line, with a black bar beneath it on each segment; a broad dorsal patch of blackish-pink is situated on the three last segments; the legs are green and the prolegs bright crimson; there are a few isolated black bristles on the larva.

This caterpillar is difficult to find, as it remains closely concealed amongst the dense manuka foliage, from which it can be dislodged only by vigorous and continued beating. The larvae allow themselves to fall a short distance, hanging suspended by a silken thread, which they rapidly ascend when the danger is past.

The pupa is enclosed in a slight cocoon about 1 inch below the surface of the earth.

The perfect insect appears from October till April. It is very common in most situations where its foodplant is found and, owing to its pale colour, is readily seen when flying in the evening twilight. Specimens may also be taken in the daytime resting with outspread wings on the trunks of trees and on fences, where they are more easily detected than many other species.

ASTHENA SCHISTARIA.

(Asthena schistaria, Walk., Cat., xxiii., 782.)

(Plate XLVIII., fig. 1 ♂, 2 ♀.)

Although closely allied to *Asthena subpurpureata* and for very many years confounded with that insect, this species may be immediately recognised by the characters set out in the following description.

The expansion of the wings is *seven-eighths of an inch*. The fore-wings have the apex rather acute and the termen of the hind-wings in both sexes gently rounded without any tooth; in the male the tornus is rounded, in the female angled. All the wings are pale greyish-ochreous; there are numerous indistinct paler wavy transverse lines, often obsolete, especially in the male and the edges of the median band are sometimes distinctly indicated, towards the dorsum, by clear fine blackish lines. The cilia of the hind-wings of the male are thick and long becoming brush-like and the claspers are much shorter than in *Asthena subpurpureata*.

The larva which feeds on manuka (*Leptospermum*) closely resembles that of *A. subpurpureata* but is generally slimmer with the pink markings absent; there are yellowish lateral lines and a fine blackish dorsal line. The habits of the two larvae appear identical and they are constantly found feeding together.

The perfect insect appears from November till April, and is found in precisely the same localities as *A. subpurpureata*.

I am much indebted to Dr. A. Jefferis Turner, of Brisbane, for directing attention to the distinctions between *Asthena schistaria* and *A. subpurpureata*.

Genus 9.—EUCHOECA Hübner.

Face smooth, flat. Antennae in ♂ ciliated. Palpi short, slender, loosely scaled. Fore-wings: areole simple. Hind-wings normal.

Also small and widely distributed.

Represented in New Zealand by one species only.

EUCHOECA RUBROPUNCTARIA.

(*Ptychopoda rubropunctaria*, Dbl., Dieff. N.Z., ii., 287. *Asthena risata*, Gn., Lep. ix. 438. *Asthena mullata*, Gn., E. M. M. v., 42. *Asthena pulchraria*, Walk., Cat. xxiii., 780; Butl., Cat. N.Z. Lep. pl. iii., 18 (nec. Dbl.). *Hippolyte rubropunctaria*, Meyr., Trans. N.Z. Inst. xvi., 60. *Epicyrma rubropunctaria*, Meyr., ib. xviii., 184; Meyr. Proc. Linn. Soc. N.S.W., 1890, 811.)

(Plate XI., fig. 39 ♂, 40 ♀.)

This little species is fairly common and generally distributed throughout both the North and South Islands, and has also occurred at Stewart Island.

The expansion of the wings is about $\frac{3}{4}$ inch. All the wings are pale ochreous, with numerous obscure reddish transverse lines. On the fore-wings there are four transverse series of black dots; the first near the base, the second a little before the middle, the third a little beyond the middle, and the fourth on the termen; between the second and third series of dots there is, in the female, an elongate blackish patch, especially towards the dorsum; a small reddish spot is situated in the middle of the subterminal area. The hind-wings have three series of

black dots; the first near the base, the second near the middle, often obscure, and the third on the termen. The termen of both fore- and hind-wings very slightly projects near the middle.

This species varies considerably in the extent of the blackish marking near the middle of the fore-wings, as well as in the colour and intensity of the reddish transverse lines.

The egg, which is laid flat, is about one-sixtieth of an inch in length, oval, considerably flattened, pale straw colour, iridescent, covered with rather large irregular hexagonal depressions.

The larva, which was first observed by Fereday,* is about $\frac{1}{4}$ inch in length; stout, slightly tapering at each end; the segments deeply incised, slightly flattened dorsally and ventrally; general colour dull green, often much suffused with brown, blackish-olive, olive green, yellow, or pink; very variable; a very conspicuous white lateral line, clouded with darker above and paler beneath; a rather narrow darker dorsal line, containing a median series of white dots; four conspicuous white-ringed black dots, forming a trapezium on the back of each segment 5 to 12 inclusive; several smaller dots on sides of segments above and below lateral line; each dot bears a stout black bristle.

The foodplant is *Haloragis erecta*, a rather local herbaceous plant, sometimes found in dry situations, especially near the sea coast.

The pupa is enclosed in a slight earth-covered cocoon.

The perfect insect appears from September till March. It is usually found in rather open situations near the sea-coast, where its foodplant is sometimes abundant. This species occurs in the Kermadec Islands and is common in New South Wales, Victoria and Tasmania. Australian and New Zealand specimens are similar in appearance.

Genus 10.—VENUSIA Curt.

Face smooth. Antennae in ♂ bipectinated, apex simple. Palpi loosely scaled. Fore-wings: areole simple. Hind-wings normal.

(Plate C., fig. 13 head of male; figs. 25 and 26 neuration of *Venusia verriculata*.)

The typical species, *Venusia cambrica*, occurs throughout northern temperate regions, and there is also one from South America. We have five New Zealand species.

VENUSIA VERRICULATA.

(*Cidaria verriculata*, Feld., Reis. Nov. pl. cxxxi., 20. *Panopaea verriculata*, Meyr., Trans. N.Z. Inst. xvi., 62. *Pancyma verriculata*, ib. xviii., 184.)

(Plate XIII., fig. 9 ♂, 10 ♀; Plate I., fig. 22 larva.)

This interesting species appears to be common and generally distributed throughout the country.

The expansion of the wings is about $1\frac{1}{2}$ inches. All the wings are pale ochreous-brown, sometimes slightly tinged with reddish; there are many straight oblique parallel dull brown lines; on the fore-wings three lines are broader and more isolated than the rest and run from the apex to the dorsum; on the hind-wings the lines near the middle are rather thicker than

*Trans. N.Z. Inst., xvi., 60.

the others, and have a broad space on each side of them; all the lines are clearly marked on the abdomen, so that each line appears to be continuous from one side of the moth to the other.

The egg, which is laid on its side, is oval, somewhat cylindrical, not flattened; vivid green with the surface covered with moderately small shallow hexagonal depressions. Four days after laying extensive irregular red blotches appear.

The length of the larva when full grown is about one inch; it is much flattened and of fairly uniform width, slightly tapering posteriorly with the segmental divisions distinct; green; the head is ochreous with two brown stripes near the top and one at each side; there is one broad and one narrow reddish sub-dorsal line and a conspicuous blackish-brown lateral line; the anal flap and prolegs are tinged with dark brown; the third and fourth segments each have a row of black warts; the remaining segments, except the last, have four black warts on the back and three on the side; there are a very few short bristles.

This larva feeds on the leaves of the Cabbage Tree Palm (*Cordyline australis*) and its flattened shape enables it to readily penetrate between them. It eats large oblong notches out of the leaves, coming abroad to feed at night.

The pupa is enclosed in a very thin network cocoon composed of silk and rubbish and placed on the surface of the ground.

The perfect insect appears from October till May, hibernating specimens being not infrequently noticed, on mild days, during the winter and very early spring. It frequents places where Cabbage Tree Palms are abundant. Mr. Fereday first observed that the moth always rests on the dead leaves of the plant, keeping its wings in such a position that the lines are continuous with the parallel veins of the dead leaf, which they precisely resemble in appearance. We have, I think, in this species a most instructive instance of special adaptation to surrounding conditions; and the action of natural selection, in preserving favourable variations of colour and habit, appears to be here unmistakably indicated. Had our investigations been confined to the examination of cabinet specimens only, we might have long remained in the dark as to the explanation of such an unusual type of wing-marking.

VENUSIA CHARIDEMA.

(*Venusia charidema*, Meyr., Sub-antarctic Islds. of N.Z. i., 70.)

(Plate XIII., fig. 6 ♂, 7 ♀.)

This interesting species was first discovered at Auckland Island, as a result of the scientific expedition to the Southern Islands of New Zealand, which took place in November, 1907. It also occurs plentifully at Campbell Island, and has subsequently been found in beech forests on the eastern side of Wellington Harbour, as well as on Flagstaff Hill, Dunedin, Ben Lomond and Bold Peak, Lake Wakatipu.

The expansion of the wings is about 1½ inches. The forewings, which have the apex rather prominent and the termen oblique are ochreous-brown in the male, reddish-ochreous or bright orange-brown in the female; both sexes have a broad cloudy blackish-grey streak from below the apex to the middle of the dorsum, and there are, in the male, in addition, three or four fine greyish streaks on the subterminal area and the veins

are dotted in black and white. The hind-wings are greyish-ochreous in the male; reddish-ochreous or orange-ochreous in the female; the male has several greyish transverse lines on the terminal area and the veins on the basal area are marked in dark grey; in the female the markings on the hind-wings are very indistinct.

The perfect insect appears in November and December, and may be looked for on hills, or near the sea-coast, where there is an abundant growth of *Dracophyllum longifolium*, on which its larva probably feeds.

VENUSIA AUTOCHARIS.

(*Venusia autocharis*, Meyr., Trans. N.Z. Inst., lv., 202.)

This very bright-looking species has occurred commonly at Whakapapa, Mount Ruapehu, at an altitude of about 4,000 feet above the sea-level.

The expansion of the wings is about 1½ inches. The forewings are very bright orange-brown, with a broad blackish-brown band from the apex to the middle of dorsum, and several very fine lines between this and the termen. In the male there are sometimes a few obscure darker dots on the veins near the termen. The hind-wings are ochreous, broadly clouded with orange-brown along termen and dorsum.

The female of this species can hardly be distinguished from the same sex in *Venusia charidema*, but in *V. autocharis* both sexes are almost identical both in colour and wing-markings.

The perfect insect appears in January, and is common in the sub-alpine forest.

VENUSIA UNDOSATA.

(*Cidaria undosata*, Feld. Reis. Nov. pl. cxxviii., 2. *Epiphryne undosata*, Meyr., Trans. N.Z. Inst. xvi., 60; *citrinata*, Warr. Nov. Zool., 265.)

(Plate XIII., figs. 1-3 ♂ varieties, fig. 4 ♀; Plate I., fig. 43 larva.)

This neatly marked little insect appears to be generally distributed throughout the country.

The expansion of the wings is hardly an inch. All the wings are pale yellow with a variable number of fine jagged reddish-brown transverse lines, which are usually most distinct towards the termen. The forewings have a broad band of reddish-brown along the costal edge; a blackish dot above the middle just touching the costal band, and a small brown mark near the apex. The hind-wings have a minute black dot a little above the middle.

This species is very variable: in some specimens the transverse lines are much broader, forming bands of reddish-brown; in others the whole of the wings are dull reddish-brown, except a small yellow area near the base; whilst others are entirely dull greyish-brown with the transverse lines very faint (fig. 1), intermediate varieties between all these forms also occurring. Generally speaking, North Island specimens (fig. 2.) appear to be more vividly coloured than those from the South Island. Specimens from the West Coast of the South Island and far south (figs. 3 and 4.) are usually very pale in colour, with all the markings extremely faint, and are larger than those taken elsewhere.

The larva, which feeds on "Ribbon Wood" (*Plagianthus betulinus* and *Guya Lyallii*) is slightly over $\frac{1}{2}$ inch in length, rather stout, green, paler underneath, with the skin slightly wrinkled; the head is ochreous; there is a broad dull crimson dorsal line containing a central black bar on each segment; two or three rows of conspicuous black warts emitting short black bristles, and a very indistinct greyish lateral line.

The larva is active in its habits, feeding freely on the leaves of its foodplant, during the spring and early summer.

The pupa is enclosed in a slight silken cocoon amongst dead leaves.

The perfect insect appears from November till February, and is often very abundant amongst lace-bark trees. The large pale-coloured form is extremely common on Arthur's Pass and in the Routeburn Valley, at the head of Lake Wakatipu.

VENUSIA XANTHASPIS.

(*Hermione xanthaspis*, Meyr., Trans. N.Z. Inst. xvi., 61. *Aulopola xanthaspis*, Meyr., ib. xviii., 184.)

(Plate XIII, fig. 5 ♂.)

This handsome insect has occurred in the North Island on Mount Ruapehu, the Tararua Ranges, near Wellington, and in the South Island at Mount Arthur, Lake Guyon, Otira and the Routeburn Valley beyond the head of Lake Wakatipu.

The expansion of the wings is from 1 to $1\frac{1}{2}$ inches. The fore-wings are bright yellow; there is a broad pale reddish-brown band on the costa; a conspicuous oval dark brown spot above the middle, often touching the costal band, and a triple series of minute brown subterminal dots. The hind-wings are pale yellow, with a triple series of minute brown dots parallel to the termen.

The perfect insect appears from December till March. It is apparently a rare species, and frequents sub-alpine forests, at elevations ranging from about 2,000 to 4,000 feet above the sea-level.

Genus 11.—ORTHOCLYDON Warr.

Face smooth slightly rounded. Palpus rather short, very shortly rough-scaled beneath. Antennal pectinations of male very long, with about 10 apical joints non-pectinate. Thorax and abdomen not crested. Fore-wings with apex acute, or even subfalcate, scaling smooth, pattern typically consisting of lines; areole double, vein 6 well stalked, cell more or less strongly imbricated in middle, vein 5 arising from slightly before its middle, 3 considerably proximal to end of cell. Hind-wings continuing the colour scheme of fore-wings; cell oblique, vein 5 arising well before its middle, vein 3 as in the fore-wings.

We have three species, formerly included under *Xanthorhoe*.

ORTHOCLYDON PRAEFECTATA.

(*Acidalia praefectata*, Walk., Cat. xxiii., 781. *Acidalia subentaria*, Walk., Cat. xxvi., 1610. *Acidalia absconditaria*, Walk., ib. 1611; Butl., Cat. N.Z. Lep. pl. iii., 21. *Larentia praefectata*, Meyr., Trans. N.Z. Inst. xvi., 78; *Orthoclydon praefectata*, Warren, Nov. Zool. 1., 393, 1894.)

(Plate XIV, fig. 21 ♂, 22 ♀; Plate II, fig. 16 young larva; fig. 17 adult ditto.)

This beautiful insect is generally distributed throughout New Zealand wherever flax is abundant. In the North Island it is common in the lowland flax areas in the Wairarapa and Manawatu districts, but in other localities it occurs most plentifully amongst flax growing at elevations between 2,000 and 3,000 feet. In the South Island it seems to be principally confined to the higher elevations, being comparatively rarely met with in the lowlands.

The expansion of the wings is from $1\frac{1}{2}$ to 1½ inches. In the male all the wings are very pale greyish-white tinged with brownish and very glossy; there is a number of extremely faint wavy grey transverse lines on the outer half of both wings, the lines on the fore-wings converging towards the apex; a blackish discal dot and sometimes, an oblique row of brownish dots on the veins. The female has all the wings snow-white with very pale grey markings similar to those in the male.

The egg is about one-thirty-second of an inch in length, slightly oval, concave above, covered with numerous hexagonal depressions; pale yellow with an elongate dappled patch of pale red.

The young larva (Plate II, fig. 16), when first excluded from the egg, is about one-twelfth of an inch in length, rather stout with the head very large and flat, pale ochreous; the eyes are black and the trophi brown; the body is pale greenish-white with numerous black warts surmounted with long black bristles; the skin is much wrinkled and there is a yellowish-brown lateral line. Before the last moult the larva is about $\frac{1}{2}$ inch in length, moderately stout, of even thickness with its surface very smooth and glossy; the head is orange-brown with two red stripes; the back yellowish and undersurface and sides pale dull green; there is a very broad dull red dorsal stripe; two fine dark red sub-dorsal lines; a fine yellowish brown lateral line, and the legs and pro-legs are yellowish-brown. It feeds on the underside of the flax leaves, excavating long channels in the green substance of the leaf about as broad as the larva. It is very sluggish and always rests on the leaf stretched at full length. The full-grown larva (Plate II, fig. 17) is about 1 inch in length, of even thickness and much flattened; the head is bright brownish-ochreous with two pinkish-brown stripes; the body reddish-ochreous; there is a very broad, rich reddish-brown dorsal line; a moderately broad lateral line, becoming pinkish towards each extremity; the ventral surface is slightly tinged with dull green; there is a row of black tubercles on the second, third and fourth segments, and a double row on the other segments, except the last; these tubercles emit short brownish-black bristles.

The flattened shape of this larva enables it to secrete itself and travel rapidly between the leaf blades of the flax (*Phormium tenax*), near the roots of the plant, and the absence or rarity of this insect in lowland flax swamps, which are flooded in winter, may, I think, be fairly attributed to the circumstance that the larvae would be drowned whilst hibernating at the bases of the leaves.

This seems to be borne out by the fact that the insect is increasing in flax areas which have been drained, and this circumstance causes flax growers some concern.*

The perfect insect appears from November till February, and is attracted by light. Owing to its white colouring the female is very conspicuous at evening dusk and is then readily captured. In the daytime, however, she retreats amongst the lower portions of the leaf-blades of the flax, and hence can seldom be obtained, but the male may generally be dislodged by vigorous beating and is easily caught as he flies out of the flax bush. It seems likely that there are at least two broods of this insect in the year.

ORTHOCLYDON PSEUDOSTINARIA.

(*Xanthorhoe pseudostinaria*, Huds., Ent. Mo. Mag. liv., 61.)

(Plate XIV., fig. 12 ♂.)

This very beautiful and distinctly-marked species was discovered at Otira. It has since occurred on the Goulard Downs, near Nelson, at an altitude of about 4,000 feet above the sea-level, and at Nelson, Mount Grey and White Rock, North Canterbury.

The expansion of the wings is 1½ inches. The fore-wings are rather broad with the apex very slightly projecting, and the termen slightly bowed; *cream-coloured with bright brown markings*; there is a narrow line along the costa; a faint slightly curved line on the inner edge of the median band; a small blackish dot; *a straight oblique very strongly-marked line from near the apex to the dorsum at three-quarters*, and a very faint wavy subterminal line; a dark brown terminal line is situated below the apex, where the cilia are also dark brown. *The hind-wings are cream-coloured with a conspicuous brown line across the middle*, and very faint traces of one basal and two subterminal lines. Except as above indicated the cilia of all the wings are cream-coloured.

The perfect insect appears in December and frequents forest. It is evidently a very rare species.

ORTHOCLYDON CHLORIAS.

(*Larentia chlorias*, Meyr., Trans. N.Z. Inst. xvi., 80; *Venusia princeps*, Huds., ib., xxxv., 244, pl. xxx., 1.)

(Plate XLIX., fig. 1 ♂, 2 ♀; Plate XIV., fig. 46 ♂ variety.)

This very beautiful species was discovered by Mr. Meyrick at Castle Hill on the West Coast Road of the South Island. It has also occurred on Mount Hector, Tararua Range, North Island, on the Dun Mountain Track, near Nelson, and at Dunedin.

The expansion of the wings of the male is 1½ inches; of the female 1½ inches. *The fore-wings of the male are bright-yellow, with purplish-orange-brown markings*. There is a shading on the costa near the base; three dots at about ½; *a large irregular somewhat triangular marking near the apex*, and two rows of dots on the subterminal area. The hind-wings are pale yellow, with three rows of dots. The head is yellow; the thorax is also yellow, with an anterior band of reddish-brown; and the abdomen is pale yellow. The antennae are strongly bipectinated, white, dotted with pale-brown.

*For an account of this insect, from the economic standpoint, see N.Z. Journal of Agriculture, July, 1917, and October, 1918.

The female has the fore-wings deep orange-yellow with four transverse lines of dots, confluent on the costa; the hind-wings are paler with three rows of dots as in the male.

The dots on both fore- and hind-wings appear to vary in size. A very beautiful variety of the male, with the dots greatly enlarged, is figured on Plate XIV., fig. 46.

The perfect insect appears in January and February, and may be looked for in beech forests, or amongst *Dracophyllum*, at about 2,500 feet above the sea-level. It is an extremely rare species.

I am indebted to Messrs. Clarke and Sunley for the opportunity of figuring this beautiful insect.

Genus 12.—ASAPHODES, Meyr.

Face with cone of projecting scales. Palpi moderate, rough-scaled. Antennae in ♂ bipectinated, apex simple. Fore-wings: areole simple. Hind-wings normal.

(Plate C., figs. 35, 36 neurulation of *Asaphodes megaspilata*.)

An endemic genus containing five species.

ASAPHODES STEPHANITIS.

(*Asaphodes stephanitis*, Meyr., Trans. N.Z. Inst., xxxix., 107.)

(Plate XIII., fig. 21 ♀.)

This brightly-marked little insect was discovered by Mr. Philpott at Invercargill.

The expansion of the wings is about 1 inch. The fore-wings are *ochreous with black and white markings*, the white markings becoming obsolete on the costa; there are indistinct blackish and white lines at the base; *the median band is margined with two wavy white lines; the outer one is broad, very conspicuous with a strong projection above the middle; within the median band there are four wavy blackish lines*; two irregular blackish lines are situated on the subterminal area followed by a very fine regularly-waved subterminal line; there is a broad black bar below the apical patch and a very fine blackish terminal line. The hind-wings are ochreous, with a very fine blackish terminal line. The cilia of all the wings are white barred with blackish.

This species has a striking superficial resemblance to a diminutive specimen of *Xanthorhoe clarata*.

The perfect insect appears from January till March, and frequents sand-hills near the sea-beach. It is attracted by ragwort blossoms.

Described and figured from specimens kindly given to me by Mr. Philpott.

ASAPHODES ABROGATA.

(*Aspilates abrogata*, Walk., Cat. xxiv., 1075. *Fidonia* (?) *servularia*, Gn., E. M. M. v., 43. *Thyone abrogata*, Meyr., Trans. N.Z. Inst. xvi., 61. *Asaphodes abrogata*, Meyr., ib. xviii., 184.)

(Plate XIII., fig. 19 ♂, 20 ♀.)

This species has occurred at Murimutu in the North Island; and in the South Island at Kekerangu, Christchurch, Castle Hill, Dunedin, and Invercargill.

The expansion of the wings is about 1 inch. *All the wings are ochreous with pale brown markings*. The fore-wings have a conspicuous dot in the middle, *a fine wavy transverse line a little*

beyond the middle, a subterminal line, and a brown shading on the termen, broader near the apex of the wing. The hind-wings have a brown central dot and two transverse lines. The cilia of all the wings are brownish.

This species varies considerably in the distinctness of the brown markings, and there is occasionally a transverse line near the base of the fore-wings.

The perfect insect appears in February and March, and frequents open tussock country, often at elevations of from 2,000 to 4,000 feet above the sea-level. It is, I think, rather a local species, though abundant where found. It occurs in considerable numbers on the chalk range near Kekerang in the Marlborough Province.

ASAPHODES MEGASPILATA.

(*Larentia megaspilata*, Walk., Cat. xiv., 1198; *Cidaria assata*, Feld., Reis. Nov. pl. cxxxi., 4; *Cidaria nehatia*, ib. pl. cxxxi., 6; *Harpalyce megaspilata*, Meyr., Trans. N.Z. Inst. xvi., 63; *Proboluca megaspilata*, Meyr., ib. xviii., 184.)

(Plate XIII., figs. 14, 15 ♂ varieties, 16 ♀; Frontispiece fig. 15 egg; Plate I., fig. 21 larva.)

This species is very common, and generally distributed throughout the country.

The expansion of the wings is about 1 inch. The fore-wings are dull ochreous; there is a series of fine brown and reddish wavy transverse lines near the base, forming a rather broad basal patch; then a pale central area containing a blackish dot above the middle; next, a very distinct band made up of several fine wavy grey lines, with a rounded projection near the middle; this is followed by numerous pale brown curved marks forming more or less broken transverse lines; there is always an oblique staty patch below the apex, and a series of minute dots on the termen. The hind-wings are ochreous brown, slightly darker towards the base, with numerous indistinct wavy brown lines. The apex of the fore-wing is very pointed and slightly hooked downwards; the termen is bowed near the middle. The female is much duller and more uniform in colour than the male, and the antennae are simple.

This species is very variable. Some male specimens have several more or less distinct white markings on the middle of the fore-wings; the transverse bands also differ considerably in both size and intensity. The females are not so variable; but in some specimens the bands on the fore-wings are almost absent, whilst others have the fore-wing rich brown, with a very conspicuous dark central band.

The egg is oval, cylindrical, pale ochreous covered with numerous shallow hexagonal depressions.

The young larva, when first excluded from the egg is barely $\frac{1}{4}$ inch in length, pale ochreous; there is a series of short fine brownish-black parallel lines on the thoracic segments and on the anterior portions of the other segments; the spaces between these lines are more or less clouded with pink; the head is greyish-ochreous mottled with blackish-brown. At this early stage the larvae stand on their prolegs with the rest of their body quite upright, the head and anterior segments being twisted round and slightly bent downwards. This device gives the whole insect a strong resemblance to a minute knobbed fungus.

The length of the full-grown larva is $\frac{3}{4}$ inch; the body is moderately stout, slightly tapering at each end; dull rusty-brown paler towards the extremities; there is a dark-edged pale dorsal line on the thoracic segments; a dark dorsal line on segments 5 to 9 with dark loop-like markings on each side of it; a conspicuous black forked marking on the back of segment 9; a row of black warts on segments 10 and 11 and, in addition to these leading markings, the rest of the upper surface is covered with numerous fine lighter and darker lines; the whole larva is also clothed with short black bristles.

This caterpillar feeds on the dead leaves of *Geniostoma ligustrifolium*. It lives through the whole winter, amongst the fallen leaves, under the bushes of its foodplant and is of extremely sluggish habits, often remaining quite motionless for hours together.

The pupa is very highly polished, dark brown tinged with greenish. It is enclosed in a frail cocoon, constructed of a dead leaf on the surface of the ground.

The perfect insect appears from October till April, and frequents forest, where it is generally very abundant. It is a difficult insect to identify on the wing, and in consequence is often captured under a misapprehension.

This species sometimes hibernates in the imago state, as we may occasionally see specimens abroad on mild evenings in the winter. Most individuals, however, pass the winter in the larval condition.

ASAPHODES RUFESCENS.

(*Larentia* (?) *rufescens*, Butl., Cist. Ent. ii., 502; *Eurydice cymosema*, Meyr., Trans. N.Z. Inst. xvi., 63. *Eurydice rufescens*, ib. xvii., 63. *Homodontis rufescens*, ib. xviii., 184.)

(Plate XIII., fig. 17 ♂, 18 ♀.)

This insect has occurred commonly at Dunedin and Invercargill and on Stewart Island, but is not nearly so generally distributed as *Asaphodes megaspilata*.

The expansion of the wings is about $1\frac{1}{4}$ inches. Although superficially very like *A. megaspilata* this is quite a distinct species and may be readily separated by the straighter termen of the fore-wings; fainter sub-apical mark; general redder tinge and slightly larger size. The fore-wings of the female are pale ochreous-brown, slightly darker towards the termen, the numerous wavy transverse lines being very indistinct. The male is often very variable and, in some of the pale varieties, the outer portion of the median band of the fore-wings is very conspicuous.

The perfect insect appears from October till March, and is found in lowland forest, gardens, and plantations. It is much attached to hedges of *Cupressus macrocarpa* and flies freely at evening dusk.

Described and figured from specimens kindly supplied by Messrs. Howes and Philpott.

ASAPHODES PARORA.

(*Harpalyce humeraria*, Meyr. (nec. Walk.), Trans. N.Z. Inst. xvi., 64; *Harpalyce parora*, Meyr., Trans. N.Z. Inst. xvii., 63; *Proboluca parora*, ib. xviii., 184.)

(Plate XIII., fig. 24 ♂, 25 ♀.)

This species, which is the largest of the genus, has occurred on Mount Ruapehu, at Wanganui, Lake Horo-

whenua, near Wellington, Christchurch, Mount Hutt, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female almost $1\frac{1}{2}$ inches. The fore-wings, which have a deep curved indentation below the apex and a marked projection above the middle of the termen, are very dull brownish-ochreous, much darker and slightly tinged with reddish in the female. The fore-wings of the male are traversed with numerous fine wavy darker transverse lines, often dotted with black where they cross the veins; the lines at the edges of the basal patch and median band are also stronger than the others; there are several curved blackish bars on the costa; two on the dorsum near the base; a conspicuous black crescentic mark below the costa near the apex and a terminal series of black dots. The hind-wings are dull greyish-ochreous in the male, reddish-ochreous in the female, with a series of terminal black dots, the termen itself being strongly waved. In the female all the markings are much less distinct and the whole of the median band is more or less clouded with blackish-grey.

The perfect insect appears from September till May, and frequents forest. Although formerly stated to be very common it is now rarely met with.

Genus 13.—PARADETIS, Meyr.

Face smooth. Antennae in both sexes bipectinated, apex simple. Palpi short, slender, loosely scaled. Fore-wings: areole simple. Hind-wings in both sexes with 8 connected with cell by oblique bar before angle; in δ 2 absent.

(Plate C, figs. 27 and 28 neuration of *Paradetis porphyrias* δ .)

Represented by a single endemic species. If related to any New Zealand genus it must probably be to *Asaphodes*, but the modification of hind-wing is very remarkable; it resembles that found in *Tatosoma* and its allies, but there does not seem to be any other relationship with them, nor is there any apparent lobe or gland in the male which would account for the absorption of vein 2. This absorption, with reduction of the dorsal area, has been compensated by extension in the costal area, and conversion of the normal anastomosis of 8 into a connection by bar only, and this structure has been ultimately transferred to the female also, notwithstanding that in this sex there was no need for it, 2 being present as usual. (Meyrick.)

PARADETIS PORPHYRIAS.

(*Parysatis porphyrias*, Meyr., Trans. N.Z. Inst. xvi. 58; *Paradetis porphyrias*, Meyr., ib. xviii., 184.)

(Plate XI, fig. 37 δ , 38 ϕ .)

This interesting little insect has occurred in the North Island at Silverstream and Wainui-o-mata, near Wellington. In the South Island it has been found at Mount Arthur, Castle Hill, the Otira Gorge, Lake Wakatipu, the Hunter Mountains, and Invercargill.

The expansion of the wings of the male is about $\frac{3}{4}$ inch; of the female fully $\frac{3}{4}$ inch. The fore-wings of the male are deep purplish-brown; there is a wavy, reddish, transverse line at about $\frac{2}{3}$ and another at about $\frac{3}{4}$; between these two lines near the dorsum there are often several more or less distinct, yellow marks; there is a conspicuous orange-yellow patch at the apex.

The hind-wings are deep purplish-brown. The cilia of all the wings are white. The fore-wing has the apex hooked and the termen deeply excavated above and below the middle. The female is very much paler; the lines are more distinct and the veins are marked in brown.

The perfect insect appears from December till February. It frequents rather open spots in the forest, and flies in a very fussy manner close to the ground amongst *Paesia scaberula* and other ferns, which are usually abundant in such situations. It rests with the fore-wings placed slightly backwards, the antennae extended forwards and the end of the abdomen turned upwards, and when the fern fronds wither they turn purplish-brown like the moth. It is consequently very inconspicuous and difficult to capture. Thus, no doubt, it is often overlooked, and is perhaps much commoner than is generally supposed.

Genus 14.—XANTHORHOE Hübner.

Face with cone of projecting scales. Antennae in δ bipectinated, apex usually simple. Palpi moderate, rough-scaled. Fore-wings: areole double. Hind-wings normal.

(Plate C, figs. 37 and 38 neuration of *Xanthorhoe clarata*.)

A cosmopolitan genus of considerable extent, but relatively far more prominent in New Zealand than anywhere else. There are no less than sixty New Zealand species already known and many others are no doubt awaiting discovery, especially in the less explored mountainous districts of the South Island. Of these sixty species three are confined to the North Island and thirty-one to the South Island. Twenty-two species are common to both islands, two are restricted to the Chatham Islands, and two to the Auckland Islands. The larvae appear to be very secretive in their habits, feeding on low plants close to the ground, and at present very few are known to us.

XANTHORHOE CHLAMYDOTA.

(*Epyaxa chlamydata*, Meyr., Trans. N.Z. Inst. xvi., 72.)

(Plate XIII, fig. 39 ϕ .)

This very handsome species has occurred at Tokaanu, Waiouru and at Wellington in the North Island, and at Christchurch, Akaroa, Mount Cook, Dunedin and Invercargill in the South Island.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are pale ochreous, with dark, purplish-brown basal patch and median band. The basal patch is slightly paler near the body, and strongly curved outwards towards the termen; it is followed by several very fine pale brown transverse lines. The median band is very broad; its inner edge is concave, and its outer edge has two rounded projections, one very large about the middle and another much smaller near the dorsum; the middle portion of this median band is considerably paler than the edges, and its two projections are bordered with bright red. The upper part of the termen is ochreous, with several faint brown marks; the lower part is dull grey. The hind-wings are dark ochreous, with a few obscure purplish-grey markings; the termen of the hind-wing projects slightly near the middle, and is rather jagged.

This species varies a little in the depth of its colouring, but the markings appear to be constant.

The perfect insect appears from November till April. It chiefly frequents light forest or scrub, but is not a common species.

XANTHORHOE OROPHYLOIDES.

(*Xanthorhoe orophyloides*, Huds., Sub. Ant. Islds. of N.Z. 68, pl. II, 12.)

(Plate XIII, fig. 38 ♂.)

This rather inconspicuous species was discovered by Captain Dorrien-Smith at the head of the north arm of Carnley Harbour, Auckland Island, during the visit of the scientific expedition in November, 1907. It has also occurred on Campbell Island.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are rather narrow, with the apex somewhat acute, and the termen slightly curved oblique, pale bluish-grey with brownish-grey markings; a rather faint transverse line at about $\frac{1}{4}$ strongly marked on the cell by a cloudy wedge-shaped mark; a stronger transverse line at three-quarters well marked by a series of dark marks on each of the veins, those nearest the cell being considerably larger than the rest; a fairly distinct terminal shading of dark grey and a large wedge-shaped pale apical patch; the median band generally is paler and browner than the rest of the wing. The hind-wings are pale grey. The cilia are greyish-white, with a few brownish-black scales only.

This species is very closely allied to *Xanthorhoe orophyla* and *X. rosearia*, but may be easily separated from either by its narrower wings.

XANTHORHOE OROPHYLA.

(*Epyaxa orophyla*, Meyr., Trans. N.Z. Inst. xvi., 71.)

(Plate XIII, fig. 22 ♂, 23 ♀.)

This fine species has occurred in the South Island at Nelson, Castle Hill, Mount Hutt, Mount Cook, Dunedin, Central Otago, and Lake Wakatipu.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings of the male are pale grey or brownish-grey; there are several blackish lines near the base, a moderately broad median band bounded by very distinct shaded blackish lines, the lines nearest the base being almost straight; the termen is shaded with darker grey, and there is an oblique pale apical patch. The hind-wings are pale grey tinged with ochreous.

The female is slightly darker than the male; there are numerous wavy pale and dark grey lines filling up the entire wing on each side of the median band, and the principal veins are marked in ochreous.

The perfect insect appears in December, January, and February. It frequents open country on the mountain sides, at elevations of from 2,500 to 4,000 feet, and is often very common where there is a luxuriant growth of low-growing alpine plants. It seems to be specially attached to the mountains in the extreme south of New Zealand.

XANTHORHOE SEMIFISSATA.

(*Coremia semifissata*, Walk., Cat. xxv., 1320; *Coremia ypsilon*, Guen., E. M. M. v., 64; *Cidaria delicatula*, ib., 94; *Epyaxa semifissata*, Meyr., Trans. N.Z. Inst. xvi., 72.)

(Plate XIII, fig. 47 ♂, 48 ♀.)

This extremely pretty insect is very common, and generally distributed throughout the country, and has occurred in the Chatham Islands.

The expansion of the wings is about 1 inch. The fore-wings of the male are pale pink; there are several wavy brown lines forming the basal patch, a very distinct brown median band, narrowest below the middle, but much broader on the costa than on the dorsum; the centre of this band is paler towards the costa; the termen is shaded with brown, except near the apex of the wing; the veins are faintly dotted in blackish. The hind-wings are bright ochreous with numerous wavy darker lines. The female is darker in colour than the male, the median band is broader; there are many fine brown and pink wavy lines on each side of the median band, and the principal veins are marked in pale ochreous. The grey transverse lines on the hind-wings are often more distinct in the female than in the male.

Specimens taken in the North Island are generally slightly smaller and with the pink colouring more vivid than those from the South Island. Beyond the usual slight fluctuations in the intensity of the markings there are no other variations.

The perfect insect appears from September till April, and is very common in rather open forest districts, usually frequenting undergrowth on the edges of the denser forest. There are probably at least two distinct broods in a season. It is often one of the earliest of the *Geometridae* to appear in spring, and its advent is then especially welcome to the collector after the long inaction of winter. It is evidently closely allied to *X. orophyla*, which appears to be the southern and Alpine representative of this interesting insect. *Coremia ypsilon*, Guen., is the male, and *Cidaria delicatula*, Guen., is the female of this species.

XANTHORHOE LOPHOGRAMMA.

(*Xanthorhoe lophogramma*, Meyr., Trans. Ent. Soc. Lond. 1897, 386.)

(Plate XIII, fig. 45 ♂, 46 ♀.)

This species has occurred at Castle Hill, on the Christchurch-West Coast Road.

The expansion of the wings is about $1\frac{1}{2}$ inches. The insect differs from *X. semifissata* in the following respects: In the male the general colour is considerably duller and darker, the outer edge of the median band on the fore-wings is more indented, and the veins are not dotted in black. In the female the markings on the fore-wings are less distinct, the veins are not marked in pale ochreous, the outer edge of the median band is more deeply indented, and there is a darker shading near the termen than in *X. semifissata*. The hind-wings of both sexes are dark ochreous, without any transverse markings.

The perfect insect appears in January, and frequents dry beech scrub.

XANTHORHOE ROSEARIA.

(*Cidaria rosearia*, Dbld., Dieff. N.Z. ii. 285, Butl., Cat. Lep. pl. iii., 13. *Coremia arduaria*, Guen., E. M. M. v., 63. *Coremia inamocaria*, Guen., E. M. M. v., 63. *Epyaxa rosearia*, Meyr., Trans. N.Z. Inst. xvi., 71.)

(Plate XIII, fig. 41 ♂, 42 ♀; Frontispiece fig. 13 egg.)

This species has occurred at Auckland and Wellington in the North Island; and in the South Island at Akaroa, Christchurch, Dunedin and Invercargill.

The expansion of the wings is about 1 inch. The fore-wings of the male vary from pinkish-grey to pale greenish-grey; there is an obscure darker basal patch; a rather broad median band, formed of several wavy darker grey lines, generally absent towards the middle of the band; there is a black discal dot; the termen is shaded with grey, and there is an oblique pale mark near the apex. The hind-wings are pinkish-grey with a few very faint wavy lines. The cilia of all the wings are pinkish-grey. In the female the fore-wings are dull yellowish-grey or greenish-grey, with the markings very indistinct.

Both sexes vary slightly in the ground colour, and in the intensity of the markings.

The egg, which is laid flat in small clusters, is oval, pale yellow, with numerous small hexagonal depressions and sunken side. It changes first to orange, and then to dull grey before hatching. The young larva, when first emerged, is pale greyish-brown and very slender. Later on the caterpillar becomes dull olive-green speckled with black; there are two paler stripes on the mid-back; a fine black subdorsal line, followed by a very fine white one; a broad pink lateral stripe; below this is a broad black line followed by a white line and two fine black ones. The larva is moderately stout, and the two prolegs are very close together.

The larva, when full-grown, measures about $\frac{3}{4}$ inch in length. The general colour is dull reddish-brown, often greenish-tinged. The back and sides are marked with numerous slightly wavy fine black lines; there is a double series of black dots down the back, a broad black lateral line, followed by a fine white line. The under side of the larva is pinkish-brown; the head greenish-brown speckled with black. The caterpillar is obscurely marked, and very variable. It is often clouded with greenish colouring.

The foodplants are watercress and nasturtium.

The pupa is enclosed in a slight cocoon constructed of earth and silk, on the surface of the ground.

The perfect insect is most abundant in December, and is attracted by light. It seems to be about during the entire year, numerous specimens having been taken from May till September, and hence it is often regarded as essentially a winter species. It is probable that there are two broods in the course of a year, and that the insect hibernates as an imago. *C. arduaria*, Guen., is the male and *C. inamoenaria*, Guen., the female of this species. *C. subidaria*, Guen., quoted by Butler as a synonym, is an Australian species, and not identical.

XANTHORHOE CINNABARIS.

(*Laurentia cinnabari*, Howes, Trans. N.Z. Inst., xliv., 203.)

(Plate XI, fig. 44.)

This pretty species was discovered by Mr. A. A. Howes on the Garvie Mountains, near Kingston, Lake Wakatipu. Mr. Philpott has also detected it in the Greenstone Valley in the same district.

The expansion of the wings is nearly $\frac{3}{4}$ inch. The fore-wings are pale ochreous-yellow with a dark-edged brownish basal patch; the median band is also brownish, rather narrower than usual,

with a strong angulation on its outer edge near the middle; it is bordered first with dark brown and then with distinct whitish lines; there is a broken whitish subterminal line. The hind-wings are bright ochreous-yellow.

There is considerable variation in the depth of the colouring and in the extent of the dark markings, the males being, generally-speaking, darker than the females.

The perfect insect appears in November, and is found in swampy places amongst tussock.

Described and figured from a specimen in the Dominion Museum.

XANTHORHOE BULBULATA.

(*Cidaria bulbulata*, Guen., E. M. M. v., 94. *Laurentia bulbulata*, Meyr., Trans. N.Z. Inst. xvi., 84.)

(Plate XIII, fig. 11 ♂.)

This species has occurred in the South Island at Keke-rangu, Christchurch, Castle Hill, Lake Pukaki, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is barely 1 inch. The fore-wings are pale brownish-ochreous with darker brown markings; there is a faint basal patch; a moderately broad median band with a distinct rounded projection near the middle; the termen is broadly shaded with brown, with a wavy paler subterminal line; there are often several oval paler marks in the middle of the median band, and pale brown spots and lines between the darker brown markings. The hind-wings are bright orange, with the cilia pale brown.

The perfect insect appears from September till March, and frequents open, grassy places, from the sea-level to elevations of from 2,000 to 3,000 feet.

XANTHORHOE PRACTICA.

(*Xanthorhoe practica*, Meyr., Trans. N.Z. Inst., xliii., 72.)

(Plate XI, fig. 43 ♂.)

This neatly-marked little species has occurred at Auckland, Martinborough, and at Porirua, near Wellington, in the North Island; in the Motueka Valley near Nelson, at Christchurch and Dunedin in the South Island.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings, which have the costa strongly arched near the apex, are pale ochreous-brown; there is a rather ill-defined basal patch followed by a narrow transverse line; a moderately broad dark grey median band, concave on its inner edge, wavy and slightly projecting near the middle on its outer edge and containing two black wavy transverse lines, the borders of the median band are clouded with warm brown; there is a fine wavy brown line followed by a similar subterminal line, a cloudy patch on the costa at the apex and two fainter patches on the termen. The hind-wings are greyish-ochreous with darker and lighter transverse lines, strongest on the dorsum; there is a very wavy whitish subterminal line. The female is darker than the male, but some individuals of both sexes are considerably darker than others.

Apart from structural characters, this species suggests a very diminutive specimen of *Hydriomena deltoidata*.

The perfect insect appears in January and February, and seems to frequent rather open country. It is a rare species.

XANTHORHOE VENIPUNCTATA.

(*Panagra venipunctata*, Walk., Cat. xxvi., 1666; *Xanthorhoe lucidata*, Huds. N.Z. Moths, 64, pl. vii., 38; *Larentia psamathodes*, Meyr., Trans. N.Z. Inst. xvi., 81.)

(Plate XIII, fig. 35 ♂.)

This rather dull-coloured species has occurred at Auckland, Taranaki, Napier, Palmerston, and Wellington in the North Island, and at Dunedin and Invercargill in the South Island. It is also found at Stewart Island and on the Chatham Islands.

The expansion of the wings is about 1 inch. The fore-wings, which have the termen strongly oblique, are dull yellowish-brown; there are numerous fine almost straight blackish-grey lines parallel to the termen, forming an indistinct basal patch, a broad median band, and a cloudy shading, the last being followed by a broken whitish subterminal line; there is a black discal dot, and the veins are marked with white dots between the transverse bands. The hind-wings are pale dull ochreous, with numerous, rather faint, wavy, grey, transverse lines, much more distinct near the dorsum. There is a series of minute black dots on the termen of both fore- and hind-wings.

The perfect insect appears during the winter months from March till August. It is rather a scarce species, but on mild evenings it is sometimes taken at light.

XANTHORHOE LUCIDATA.

(*Larentia lucidata*, Walk., Cat. xxiv., 1200; Prout., Proc. N.Z. Inst. xlv., 53; *Coremia plurimata*, Walk., Cat. xxv., 1321; *robustaria*, Walk. ib., 1320.)

This species is stated to be smaller than *Xanthorhoe venipunctata*, with the transverse lines less straight, and the colours more varied, etc. I am unacquainted with the species, which does not appear to be represented in any collection in the Dominion.

XANTHORHOE HOMALOCYMA.

(*Xanthorhoe homalocyma*, Meyr., Trans. Ent. Soc. Lond., 1902, 274.)

(Plate XI, fig. 36 ♂.)

This very dull and inconspicuous-looking insect has occurred at the Chatham Islands.

The expansion of the wings is about 1 inch. The fore-wings, which have the costa arched before the apex and the termen almost straight and oblique, are very dull brownish-grey; there is a number of ill defined oblique dusky transverse streaks forming an obscure basal patch and median band; the apical patch and subterminal area are distinctly paler than the rest of the wing and the veins are dotted in black where they cross the sub-basal and subterminal areas. The hind-wings are very pale greyish-ochreous, with several obscure darker transverse lines on the dorsum. All the wings are margined with minute blackish dots.

Apparently somewhat variable in the distinctness of the markings.

Described and figured from a specimen in the Fereday collection.

XANTHORHOE SUBDUCTATA.

(*Larentia subductata*, Walk., Cat. xxiv., 1198; *Epyaza subductata*, Meyr., Trans. N.Z. Inst. xx., 55.)

(Plate XIII, fig. 34 ♀.)

This species has occurred at Kaeo and at Auckland. It appears to be confined to the extreme north of the North Island.

The expansion of the wings is about 1 inch. The fore-wings, which have the apex rather acute and the termen very oblique and slightly waved are pale ochreous-brown with dark ochreous-grey markings; there is a small basal patch with a waved margin; the median band is oblique margined with two broad darker bands, the outer band with a prominent projection in the middle, the central portion of the median band is pale ochreous-brown and contains an elongate oblique discal dot; there are faint traces of a subterminal line, a pale apical patch and a terminal brownish-ochreous shading. The hind-wings are very dull pinkish-grey with a darker basal area and three indistinct terminal bands.

Although somewhat larger in size, this species is very doubtfully distinct from *X. rosearia* with which Mr. Prout considers it identical.

The perfect insect appears in December and January.

XANTHORHOE SUPPRESSARIA.

(*Phibalapteryx suppressaria*, Walk., Cat. xxvi., 1721; Meyr., Trans. N.Z. Inst. xvii., 67.)

This species, of which a unique specimen exists in the British Museum, is stated to have been taken at Auckland in the very early days of the Colony.

♀. Blackish cinereous, a little paler beneath. Palpi perfect, compressed, fringed, subrostriform, much shorter than the breadth of the head; third joint very short. Wings elongate, moderately broad; marginal festoon black; exterior border slightly notched. Fore-wings acute with many black oblique indistinct slightly denticated lines; an indistinct ferruginous band near the base, an oblique ferruginous subapical streak, and a pale cinereous diffuse middle band; exterior border slightly convex, very oblique. Hind-wings with a few indistinct lines. Length of the body 5 lines; of the wings 14 lines.

I am unacquainted with this species. The above is copied from the original description.

XANTHORHOE CINEREARIA.

(*Cidaria cinerearia*, Doubl., Dieff. N.Z. ii., 286; Huds., N.Z. Moths, pl. viii., 2; Prout, Proc. N.Z. Inst. xlv., 52; *Larentia invexata*, Walk., Cat. xxiv., 1199; Butl., Cat. N.Z. Lep. pl. iii., 11; *Larentia inoperata*, Walk., Cat. xxiv., 1201; *L. diffusaria*, ib., 1201; *L. infusata*, ib., 1199; *Larentia infantaria*, Guen., Ent. Mo. Mag. v., 62; *Helastia eupithecia*, A. Guen., Ent. Mo. Mag. v., 95; *Cidaria adonata*, Feld., Reiss. Nov., pl. cxxxi., 31.)

(Plate XI, figs. 41, 42 ♂, varieties.)

This pretty pale mottled-grey species is very common and generally distributed throughout the country.

The expansion of the wings varies from about $\frac{3}{4}$ inch to $\frac{5}{8}$ inch. All the wings are delicate whitish-grey. The fore-wings have numerous fine wavy darker grey transverse lines, strongest on the margins of the basal patch, median band and subterminal

area; these lines run together on the costa where they form three or four broad blackish bars of variable length and intensity. The hind-wings have two or three extremely faint transverse lines. All the cilia are pale greyish-white barred with blackish-grey.

There is a very beautiful form, found in forests in both islands, at elevations between 2,500 and 4,000 feet above the sea-level, in which the ground colour is almost white and the transverse lines nearly absent, except on the costal area, where there are three very conspicuous blackish-brown bars, the outermost extending half way across the wing (fig. 42). If this form is regarded as a distinct species the name *Xanthorhoe eupitheciaria* should be given to it.*

The perfect insect appears from October till March. It rests on stones, or bare ground, and is very partial to the sides of road cuttings where it sometimes occurs in considerable numbers. It is also fond of resting on walls and fences.

XANTHORHOE PLUMBEA.

(*Xanthorhoe plumbea*, Philp., Trans. N.Z. Inst. xlvii., 194.)

This very obscure species has occurred at Queenstown, Lake Wakatipu. It is evidently very closely allied both to *X. cinerearia* and *X. semisignata* and is apparently somewhat intermediate between them.

The expansion of the wings is about $\frac{7}{8}$ inch. It seems to be only characterized by the bluish ground colour, reddish-ochreous tinge on veins posterior to second line, and longer antennal pectinations(?)

The perfect insect appears in November.

XANTHORHOE FARINATA.

(*Larentia farinata*, Warr., Nov. Zool. iii., 388; Prout, Proc. N.Z. Inst. xlv., 52.)

This very obscure form has occurred in the Botanical Gardens at Wellington.

The expansion of the wings of the male is $\frac{7}{8}$ inch; of the female almost 1 inch.

It is described as "of a more unicolorous slaty-grey (not brownish-grey) than *Xanthorhoe cinerearia*, and is larger and more weakly marked. About 21 segments of the antennae are pectinated."

XANTHORHOE SEMISIGNATA.

(*Larentia semisignata*, Walk., Cat. xxiv., 1200; Prout, Proc. N.Z. Inst. xlv., 52; *Larentia punctilineata*, Walk., Cat. xxiv., 1202; Butl., Cat. N.Z. Lep. pl. iii., 12; *Cidaria dissociata*, Walk., Cat. xxvi., 1734; *Cidaria similisata*, ib., 1735; *Larentia corcularia*, Guen., Ent. Mo. Mag. v., 61; *Xanthorhoe cinerearia*, Huds., N.Z. Moths, pl. viii., 2A.)

(Plate XIII., fig. 37 ♂; Frontispiece fig. 14 egg.)

This rather dull-looking insect is very common and generally distributed throughout the country, and is also found on Stewart Island.

*Trans. N.Z. Inst. li., 350.

The expansion of the wings is from 1 to $1\frac{1}{4}$ inches. All the wings are rather pale dull grey, sometimes very slightly tinged with brown. The fore-wings have numerous fine wavy darker grey transverse lines, strongest on the margins of the basal patch, median band and subterminal area; there is usually an elongate black discal dot, and the veins are more or less dotted with black and dull white. The cilia of all the wings are pale grey, barred with darker grey.

This species varies slightly in depth of colour and intensity of markings.

The perfect insect appears from October till March. It is usually found in dry stony places where its grey colouring is highly protective. It is often very abundant in river beds.

XANTHORHOE CLANDESTINA.

(*Xanthorhoe clandestina*, Philp., Trans. N.Z. Inst. liii., 338.)

(Plate XII., fig. 38 ♂.)

This very distinct species was discovered by Mr. Gourlay at Arthur's Pass.

The expansion of the wings is $1\frac{1}{8}$ inches. The fore-wings, which have the costa strongly bent at the apex and the termen oblique, are rather deep slaty-grey with indistinct darker markings; there is a small basal patch consisting of about three wavy transverse lines; a narrow sub-basal band of about two lines; a broad median band margined by two or three wavy transverse lines enclosing a pale central area with blackish discal dot; an obscure subterminal band. The hind-wings are pale grey darker towards the termen. The underside of all the wings is pale grey with very faint costal and subterminal markings.

The perfect insect appears in February.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

XANTHORHOE PERIPHAEA.

(*Xanthorhoe periphaea*, Meyr., Trans. Ent. Soc. Lond., 1905, 220.)

(Plate XIII., fig. 36 ♂.)

This very obscurely-marked species has occurred at Macetown, Ben Lomond and on the Humboldt Range, at the head of Lake Wakatipu, at an altitude of about 4,000 feet above the sea-level.

The expansion of the wings is $1\frac{1}{4}$ inches. The fore-wings, which have the apex slightly acute, are very dull greyish-ochreous; the costa is marked with dull reddish-brown and the basal patch, median band and terminal areas are sparsely speckled with blackish-grey and white scales. The hind-wings are dull greyish-ochreous.

Distinguished from its allies by its extremely obscure markings and generally dull colouring.

The perfect insect appears in February and March, and frequents open country on the mountain sides.

XANTHORHOE FALCATA.

(*Larentia falcata*, Butl., Cist. Ent. ii., 501; Meyr., Trans. N.Z. Inst. xx., 58.)

A single specimen of this species is in the British Museum collection of New Zealand Lepidoptera. Of this specimen Mr. Meyrick remarks as follows:—

"This appears to be a good species allied to *X. camelias*, but with the costa of fore-wings less arched posteriorly, and posterior edge of median band practically straight, not bent near costa; also much darker in general colouring. I have not yet seen any specimen except the original type."

Mr. Prout considers that the specimen referred to is nothing but a large dark form of *Asaphodes rufescens*.

XANTHORHOE CAMELIAS.

(*Larentia camelias*, Meyr., Trans. N.Z. Inst. xx., 58.)

(Plate XIII., fig. 12 ♂, 13 ♀.)

This very local species was discovered by Mr. Meyrick in the North Island at Whangarei, and has since been found at Waimarino and Taihape. In the South Island it has occurred at Otira and at Wallacetown, near Invercargill.

The expansion of the wings of the male is 1½ inches; of the female about 1 inch. The fore-wings, which have the costa strongly arched before the apex and the termen deeply indented below the apex, are rather dark ochreous-grey, strongly tinged with reddish-brown in the female; the basal patch and median band are margined with very broken wavy whitish lines; the apical portion of the outermost line forming two conspicuous crescentic marks; inside the median band there are several wavy brownish lines and a conspicuous discal dot; outside a series of brownish subterminal spots. The hind-wings are pale ochreous, with several grey transverse lines, darker on the dorsum, and a rather conspicuous discal dot.

The perfect insect appears in December and January, and frequents forest. It is evidently extremely local, although fairly common where found.

XANTHORHOE CHIONOGRAMMA.

(*Larentia chionogramma*, Meyr., Trans. N.Z. Inst. xvi., 82.)

(Plate XIII., fig. 44 ♂, 43 ♀.)

This very dull-looking species has occurred on Mount Egmont in the North Island. In the South Island it has been found on Mount Arthur, Mount Hutt, at Otira and Lake Wakatipu.

The expansion of the wings of the male is 1½ inches; of the female 1¼ inches. The fore-wings are rather dark greyish-brown; there are numerous indistinct wavy paler and darker transverse lines near the base; a broad dark brown median band paler in the middle, containing a minute blackish discal dot, and edged with an interrupted jagged white line towards the termen; there are several broken darker and paler lines on the subterminal area. The hind-wings are very pale greyish-ochreous, clouded with grey near the base, and with several rows of small cloudy grey spots near the termen. The female is paler than the male and the markings are less distinct.

The perfect insect appears in December and January, and frequents wooded valleys on the lower slopes of the mountains, at elevations of from 2,000 to 3,000 feet.

XANTHORHOE CHLOROCAPNA.

(*Xanthorhoe chlorocapna*, Meyr., Records of Canterbury Museum, ii., 5, 271.)

(Plate XIV., fig. 11 ♂.)

This very striking species was discovered by Mr. C. Lindsay, at Mangere, Chatham Islands.

The expansion of the wings is slightly under 1 inch. The fore-wings, which have the costa strongly arched before apex, and the termen slightly outwards-bowed near middle, are deep sooty-brown; the costal region is clouded with brownish-ochreous towards base, where there are traces of several transverse lines; a conspicuous brownish-ochreous mark on costa at ⅔, continued as a broken line almost across the wing, and indicating the outer edge of the median band. The hind-wings are deep sooty-brown, without markings. All the cilia are warm brownish-ochreous.

The perfect insect appears in January.

Described and figured from specimens kindly given to me by Professor Speight, Canterbury Museum.

XANTHORHOE CEDRINODES.

(*Xanthorhoe cedrinodes*, Meyr., Trans. N.Z. Inst. xliii., 72; *X. undulata*, Philp., Trans. N.Z. Inst. xlv., 76.)

(Plate XIII., figs. 27, 28 ♂, varieties.)

This rather large and conspicuous insect was discovered on the Mount Arthur Tableland, at an altitude of about 4,000 feet above the sea-level. It has also occurred on Mount Ruapehu and at Dunedin, Invercargill and Stewart Island.

The expansion of the wings is from 1½ to almost 1¾ inches. The fore-wings, which have the costa almost straight, the apex rather acute and the termen strongly scalloped, are dull pinkish-ochreous with the basal patch and median band dull pinkish-brown; the inner edge of the median band is concave and strongly waved, the outer edge has a curved indentation above the middle and two rounded projections below the middle, in addition there are other slighter irregularities; the basal patch and median band are both traversed by numerous fine wavy blackish transverse lines and the intervening spaces with fine whitish-ochreous lines; all the veins are strongly marked with black and white dots. The hind-wings are pale dull pinkish-ochreous, with numerous fine wavy grey transverse lines strongest near the dorsum, but obsolescent beyond the middle; the termen is strongly scalloped. All the wings have a terminal series of black marks and the cilia are dull pinkish-grey. In the female the median band is very faint, and the general colouring duller and much more uniform than in the male.

Both sexes vary considerably in the intensity of the markings and in the general brightness of the colouring.

A rather smaller and much brighter form (fig. 27) occurs around Dunedin, in which the ground colour of the fore-wings is yellowish-brown and the basal patch and median band rich chocolate brown. Another form (*X. undulata*, Philp.) has the principal veins on the outer portions of the median band sharply marked in black, the rest of the markings being more indistinct than usual. As already stated, this insect has often been confused with *Hydriomena prionota* from which, however, it may be immediately distinguished by its larger size and the pectinated antennae of the male.

The perfect insect appears from September till February, and is attracted by blossoms. It is usually found amongst open scrub composed of Manuka, *Dracophyllum* and other shrubs.

XANTHORHOE UMBROSA.

(*Xanthorhoe umbrosa*, Philp., Trans. N.Z. Inst. xlix., 241.)

(Plate XIII., fig. 29 ♂.)

This fine species was discovered by Mr. Philpott on Mount Cleughearn, Southland, at an elevation of about 3,200 feet above the sea-level.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings, which have the apex slightly produced, are pale green with very numerous blackish-grey wavy transverse markings; there is a very indistinct basal patch; a more clearly defined median band with its outer edge concave below the costa and with two rounded projections below the middle; there are two series of rather conspicuous black bars on the veins near the outer edge of the median band, and a well-defined strongly waved subterminal line. The hind-wings are greyish-white with wavy blackish median and subterminal lines and a double series of blackish bars on the veins. The margins of all the wings are strongly scalloped; there is a terminal series of black crescentic marks and the cilia are pale greenish-grey.

This species is apparently closely allied to *X. cedri-nodes* which it much resembles in its wing outline and general character of markings.

The perfect insect appears in January, and may be taken commonly at night, on the flowers of *Dracophyllum longifolium*. I am indebted to Mr. Philpott for specimens.

XANTHORHOE SUBOBSCURATA.

(*Scotosia subobscurata*, Walk., Cat. xxv., 1358; *Cidaria ascotata*, Feld. Reis. Nov. pl. cxxx., 9; *Larentia petropola*, Meyr., Trans. N.Z. Inst. xvi., 82.)

(Plate XIII., fig. 30 ♀.)

This fine insect has occurred at Nelson, in the Otira Gorge, at Mactown in Central Otago, and on Bold Peak, Lake Wakatipu.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are pale slaty-grey very slightly tinged with ochreous; the basal and sub-basal patches and the median band are margined with rather irregular, faint whitish lines; there is a broad dark slate-coloured shading on the termen traversed by a wavy whitish subterminal line. The hind-wings are paler than the fore-wings with similar markings.

The perfect insect appears from January till March. It is very rarely met with, but may be looked for in bare rocky places about 2,000 feet above the sea-level. Its colouring is evidently protective when the insect is resting on rock surfaces.

Described and figured from a specimen in the Dominion Museum.

XANTHORHOE NEBULOSA.

(*Xanthorhoe nebulosa*, Philp., Trans. N.Z. Inst. xlix., 241.)

(Plate XIII., fig. 26 ♀.)

This very interesting species was discovered by Dr. Thomson and Mr. Harold Hamilton at the Bluff, Clarence River, Marlborough.

The expansion of the wings is $1\frac{1}{2}$ inches. All the wings are pale cream-coloured, slightly tinged with ochreous towards the body and strongly clouded and speckled with bluish-grey on the

terminal area; the fore-wings have the basal line distinct, very fine strongly curved and slightly waved; the first and second lines are also very fine, brownish, very strongly waved and much closer together than usual; there is a distinct discal dot.

The perfect insect appears in March. The name *nebulosa* is singularly appropriate.

Described and figured from the type specimen in the Dominion Museum.

XANTHORHOE COSMODORA.

(*Larentia cosmodora*, Meyr., Trans. N.Z. Inst. xx., 57.)

This species was discovered by Mr. Meyrick in the South Island on Mount Arthur, at an elevation of 4,500 feet.

The expansion of the wings of the female is slightly over 1 inch. The fore-wings have the costa hardly perceptibly arched, termen slightly rounded, oblique; whitish-ochreous, slightly yellowish-tinged; a curved irregular black line rather near base, followed by a white line; median band rather darker, tinged with yellowish-fuscous towards edges, margined with dentate black lines and outside these with white, anterior from one-third of costa to two-fifths of dorsum, rather curved, posterior from two-thirds of costa to three-fourths of dorsum, somewhat prominent beneath costa, and with a more distinct double prominence in middle; two white dentate-edged spots within median band, first beneath costa, containing small black discal dot, second on dorsum; a waved white subterminal line; a fine dark fuscous terminal line interrupted into numerous dots; cilia whitish-ochreous, with dark fuscous bars hardly reaching base. Hind-wings whitish-ochreous, with faint darker greyish-tinged lines; a median band of four more distinct cloudy grey lines, first three straight, fourth well-marked, rather dark fuscous waved, somewhat prominent in middle, beneath confluent with third; a faint white subterminal line; cilia pale whitish ochreous, with a faint greyish line tending to form spots.

Appears in January. Possibly the other sex of *Xanthorhoe bryopis*.

I am unacquainted with this insect. The above particulars have been taken from the original description.

XANTHORHOE BRYOPIS.

(*Larentia bryopis*, Meyr., Trans. N.Z. Inst. xx., 57.)

(Plate XLIV., fig. 5 ♂.)

This species was discovered by Mr. Meyrick on the Mount Arthur Tableland, in January, 1886, at an elevation of 4,500 feet above the sea-level.

The expansion of the wings is slightly over 1 inch. The fore-wings are dull greenish-ochreous with numerous jagged blackish transverse lines; the edges of the basal patch and median band are marked with white, and the middle of the median band is also speckled with white; there is a very distinct elongate discal dot; the space immediately beyond the median band is conspicuously paler; there is a cloudy subterminal band, containing a faint wavy whitish line and a series of double blackish terminal dots. The hind-wings are brownish-ochreous, with a paler subterminal line and a series of double terminal dots.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

XANTHORHOE IDA.

(*Xanthorhoe ida*, Clarke, Trans. N.Z. Inst. lvi., 417.)
(Plate XI, fig. 18 ♂.)

This species was discovered by Mr. W. G. Howes at Eweburn Stream, near Mount Ida, Central Otago.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings of the male are pale brown with fine wavy blackish-brown transverse lines, the basal area is slightly tinged with reddish-brown, and the terminal area beyond the median band much more strongly suffused with reddish-brown; basal line with three distinct dentations margined with white; first line very similar to this, but rather obscure; a small black blotch on costa at inner edge of median band; a distinct black discal dot in median band below costa; several wavy blackish transverse lines on outer third of median band; extreme outer edge of median band margined with white, three small sinuations below costa, followed by a distinct rounded projection towards termen below middle, three small sinuations immediately before junction with dorsum at $\frac{3}{4}$; beyond median band there is a narrow band of reddish-brown, followed by a darker subterminal band; the terminal area is reddish-brown with the veins broadly marked in blackish-grey; a series of blackish terminal marks; cilia brownish-grey with darker bars. The hind-wings are pale ochreous, with the termen distinctly sinuate; several faint wavy transverse lines on basal half; a series of subterminal brownish spots and a terminal series of blackish lunules; the cilia are blackish-grey. The antennae are heavily bipectinated.

The perfect insect appears in February.

Described and figured from rather a poor specimen kindly submitted by Mr. Clarke.

XANTHORHOE PRASINIAS.

(*Larentia prasinias*, Meyr., Trans. N.Z. Inst. xvi., 81.)
(Plate XIII, fig. 49 ♂.)

This bright-looking species has occurred in the North Island on Mount Egmont, and in the South Island at Mount Arthur, Castle Hill, Arthur's Pass, Otira, Lake Wakatipu, and Invercargill.

The expansion of the wings is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. The fore-wings are bright orange-yellow with deep purplish-brown markings; there is a very small basal patch with its outer edge indented; a very broad median band, composed of five or six more or less confluent wavy transverse lines, with irregular yellow spaces between them, the largest of these spaces containing a small black discal dot; the outer edge of the median band is very wavy, and has several rather prominent projections near the middle; there are several rather faint brownish lines on the subterminal area; the cilia are yellow, barred with dark brown. The hind-wings are pale ochreous, shaded with grey near the base, and with yellow near the termen; the cilia are yellow, barred with brown.

This species varies considerably in the depth of the ground colour, and in the thickness and density of the transverse lines which form the markings.

The perfect insect appears in November, December, and January, and is usually found in dry beech forests, or amongst sub-alpine scrub, at elevations of about 3,000 feet above the sea-level. It seems to be specially attached to *Coprosma parviflora*, a very small-leaved dull green shrub which often grows freely in such situations. In the extreme south, however, *X. prasinias* is a lowland insect.

XANTHORHOE LIMONODES.

(*Epyaxa limonodes*, Meyr., Trans. N.Z. Inst. xx., 54.)
(Plate XIII, fig. 32 ♂, 33 ♀.)

This species has occurred at Waimarino, Ohakune, Mount Egmont and Wellington in the North Island, and at Buller River, Otira, Poherua and Lake Wakatipu in the South Island.

The expansion of the wings is about 1 inch. The fore-wings of the male are dull yellowish-green with numerous, rather obscure, wavy brownish transverse lines; these lines are all more distinct near the costa; there are two transverse rows of white dots near the base, a very broken line of white dots at about three-fourths, some of the dots forming a crescentic mark above the middle; beyond this line the colour is often paler, especially towards the apex, but inside this line there is often a considerably darker patch; a very distinct blackish patch is situated on the termen below the apex. The costa is very strongly arched before the apex and the termen distinctly bowed. The hind-wings are very pale greenish-ochreous; there is an obscure dusky transverse line in the middle. The female has the fore-wings much browner; there are several additional rows of white dots and a conspicuous white spot in the disc above middle.

This species is rather variable. In many specimens the dorsal half of the fore-wing is much paler than the costal half.

The perfect insect appears from November till March, and frequents damp forests. Generally speaking, it is rather a rare species, although fairly plentiful on the West Coast of the South Island.

XANTHORHOE BEATA.

(*Cidaria beata*, Butl., Pro. Zool. Soc. Lond. 1877, 397, pl. xliii., 6; Meyr., Trans. N.Z. Inst., xvi., 79; *Larentia philpotti*, Prout. ib. lviii., 77.)

(Plate XIV, fig. 1 ♂, 2 ♀.)

This very beautiful species has occurred at Ohakune and Wellington in the North Island, and at Otira, Lake Wakatipu and Invercargill in the South Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are bright green; there is a darker basal patch, edged with a jagged white line; a paler sub-basal band, followed by a darker green median band, edged with very jagged white lines, and containing several white patches; beyond the median band there is a paler subterminal area; a fine wavy white subterminal line and an oblique pale mark from the apex of the wing. The hind-wings are pale ochreous, shaded with pinkish-brown on the termen, often with one or two rows of very obscure dusky spots. The cilia of all the wings are pinkish-ochreous, with the tips whitish; they are faintly barred with brown.

The depth of colour of the median band and the white spots included therein are rather variable.

The perfect insect appears from January till March, and frequents forests. It is much commoner in the South Island than in the North Island, where its place seems to be largely taken by *Xanthorhoe benedicta*.

XANTHORHOE BENEDICTA.

(*Xanthorhoe benedicta*, Meyr., Trans. N.Z. Inst. xvi., 102;
Xanthorhoe beata, Prout, ib. lviii., 77.)

(Plate XIV., fig. 3 ♂, 4 ♀.)

This species, which is extremely similar to *X. beata*, has occurred at Wellington in the North Island, and at Christchurch, Dunedin and Invercargill in the South Island.

The expansion of the wings is about $1\frac{1}{8}$ inches. It differs from *X. beata* by the presence of an elongate black discal mark in the pale space in the median band of the fore-wings; also by the hind-wings being faintly tinged with green, with whitish cilia faintly barred with grey.

The egg, which is laid on its side, is about one-fiftieth of an inch in length, oval, considerably flattened, with a distinct concavity on each side. It is green, highly polished, with numerous very shallow hexagonal depressions. Its colour changes to greyish-green about two days prior to hatching.

The larva, when first hatched, is about $\frac{1}{16}$ inch long. Head very large pale brown; segments 2-7 inclusive dull green; rest of body ochreous-brown, terminal portions paler; there are several rows of extremely minute black warts. The eggshell is not eaten on emergence.

The length of the full-grown larva is about $\frac{1}{2}$ inch. It is subcylindrical, flattened above, with very prominent lateral ridge, produced into several rounded tubercles on the sides of each segment; terminal segments very short bringing ventral and anal prolegs close together. General colour dull pinkish-brown, rarely dull green; a series of blackish V-shaped markings on mid-back, much less distinct towards head and posterior extremity; an interrupted blackish lateral line; general colour beneath paler with several darker sub-ventral lines. Head, legs and prolegs usually tinged with green, the last-named often strongly green; there are two rows of more or less distinct tubercles around each segment, each tubercle emitting a short thick bristle. The tubercles on the posterior segments are much larger and irregular, giving that portion of the larva a rugged appearance. Younger larvae are paler and greener in colour than the adult.

This caterpillar is very sluggish in habit, hardly moving by day and dropping to the ground like a small twig. The foodplant is watercress, and the fading leaves and stems are often eaten as well as the fresh green leaves. In nature the larva no doubt is effectually disguised by feeding close to the surface of the ground on prostrate stems and leaves of the foodplant.

The pupa is enclosed in a frail cocoon on the surface of the ground.

The perfect insect appears from October till March, and frequents forest and scrub. It is often dislodged from undergrowth during the daytime, and may be found in the evening on the blossoms of the white rata. The colouring of both this species, and of *X. beata*, is extremely protective when the insects are resting on moss-covered tree trunks.

From a batch of eggs deposited by a single female, in November, 1926, there resulted, in February, 1927, 32

male, and 24 female insects. These specimens exhibit no variation in the characters relied on for the separation of the species from *X. beata*. We are indebted to Mr. Philpott for first detecting the differences between *X. beata* and *X. benedicta*.

XANTHORHOE ADONIS.

(*Xanthorhoe adonis*, Huds., N.Z. Moths, 63.)

(Plate XIV., fig. 5 ♂.)

This extremely beautiful insect has occurred in the South Island at Mount Arthur, Castle Hill, Arthur's Pass, Lake Wakatipu, Dunedin and Invercargill.

The expansion of the wings is about 1 inch. The forewings are vivid green; there is a broad, wavy, black transverse line near the base; a somewhat broken line at about one-third, much broader on the costa and edged with white towards the base; a very conspicuous broad black line at two-thirds, shaded towards the base, and sharply edged with white towards the termen; between this line and the termen there are several black marks, forming an extremely broken subterminal line. The hind-wings are pale orange-brown, with a faint grey or whitish central band.

Varies considerably in the thickness of the black lines on each side of the median band.

The perfect insect appears in January and February. It frequents forests at elevations of from 1,000 to 4,000 feet above the sea-level, but it is not common. It is evidently very closely allied to *X. beata* and *X. benedicta*.

XANTHORHOE OBARATA.

(*Cidaria obarata*, Feld., Reis. Nov. pl. cxxxi., 33; *Larentia chorica*, Meyr., Trans. N.Z. Inst. xx., 58; Huds., N.Z. Moths, 66, pl. vii., 44.)

(Plate XIII., fig. 40 ♂.)

This very beautiful insect has occurred at Waimarino and Ohakune in the North Island, and at Akaroa, Otira, Dunedin, Queenstown and Invercargill in the South Island.

The expansion of the wings is 1 inch. The forewings are dull greenish-ochreous; there is a short transverse black mark from the costa near the base; a fine wavy white transverse line, followed by a wavy black band; the middle of the wing is white, marbled with very pale blue; beyond this there is a broad black band wavy towards the termen, with a prominent rounded projection near the middle, the whole series forming a very conspicuous median band; there is a fine wavy white subterminal line a bluish-black patch on the termen below the apex, and a row of terminal black dots; the apex is very slightly projecting, and the termen strongly bowed. The hind-wings are pale ochreous-brown with several fine blackish transverse lines near the base; a broad shaded band in the middle, and a terminal series of black dots. The cilia are whitish-ochreous barred with black.

This species varies considerably in the depth of the colouring, especially in respect of the hind-wings.

The perfect insect appears in December and January, and is found on the margins of forests, but is very local.

XANTHORHOE CYMOZEUCTA.

(*Larentia obarata*, Meyr., nec. Feld., Trans. N.Z. Inst. xvi., 82; Huds., N.Z. Moths, 66, pl. vii., 45; *Xanthorhoe cymozeucta*, ib., xiv., 25.)

(Plate XV., fig. 9 ♂, 10 ♀.)

This interesting little species, which is closely allied to *X. obarata*, has occurred at Waimarino, Ohakune and Wellington in the North Island. In the South Island it has been found at Christchurch, Otira, Mount Hutt, Dunedin, Queenstown and Bold Peak, Lake Wakatipu.

The expansion of the wings is almost 1 inch. The forewings, which have the apex prominent and the termen strongly bowed, are rather dark brownish-ochreous clouded with blackish on the median band; the small basal patch, which contains two brownish lines, is margined by a fine wavy whitish line; the space between this and the median band is clouded with dull reddish; the median band is broad with a strong angulation on its outer edge near the middle; it is irregularly bordered with whitish lines and contains one or two indistinct paler patches and a black discal dot; beyond the median band there is a dull reddish or purplish subterminal shading and a very regularly waved fine subterminal line; there is a terminal series of blackish crescentic marks and the cilia are pale ochreous barred with dark brown. The hind-wings are whitish with a very pale greyish basal area and several faint wavy transverse lines; there is a terminal series of brownish crescentic marks and the cilia are pale ochreous barred with brown. The female is rather darker and duller than the male, with the transverse lines more deeply indented.

A variety occasionally occurs in which the forewings are creamy-white, with a very conspicuous blackish-brown median band, paler in the centre; there is a small brownish basal patch, and the whole of the costa is broadly edged with very pale reddish-brown.

The perfect insect appears in January, and inhabits damp forests. It is a very local species and seldom now met with. About forty years ago it was recorded by Fereday as common on the Canterbury Plain, and especially attached to gorse hedges.

XANTHORHOE GLACIATA.

(*Xanthorhoe glaciata*, Huds., Ent. Mo. Mag. lxi., 220.)

(Plate LII., fig. 11 ♂.)

This very distinct and beautiful species was discovered by Mr. C. E. Clarke on Mount Moltke, Franz Joseph Glacier, at an elevation of 5,600 feet above the sea-level.

The expansion of the wings is almost 1½ inches. The forewings, which have the costa strongly arched near the apex and the termen obliquely rounded, are bright yellow-ochreous with blackish-brown and bluish-white markings; a small bluish-white basal patch, heavily sprinkled with blackish scales; a pale yellowish-brown sub-basal band edged with blackish-brown; except on costa a clear band of yellow-ochreous before median band; inner edge of median band from about ¼ of costa to about ¾ of dorsum, margined with blackish-brown, with two deep rounded indentations above and below middle; centre of median band bluish-white, heavily sprinkled with blackish-brown scales; outer edge of median band from ¾ of costa to ¾ of dorsum, with a very strong rounded double projection slightly below middle; outer portion of band composed of several wavy lines of blackish-brown scales; a large suffused crescentic patch of dull brown

on termen below apex; a subterminal series of diffused bluish-white spots; an obscure terminal series of brown crescentic marks; cilia brownish-ochreous. The hind-wings are pale brownish-ochreous, with a broad suffused greyish terminal band, and numerous fine broken greyish lines and dots on basal ¾; a distinct grey discal dot; cilia dull ochreous-brown.

The perfect insect appears in January, and may be looked for on mountains in the South Western part of the South Island.

Described and figured from a slightly damaged specimen kindly lent to me by Mr. Clarke.

XANTHORHOE PRYMNAEA.

(*Xanthorhoe prymnaea*, Meyr., Trans. N.Z. Inst. xliiii., 73.)

(Plate XIV., fig. 6 ♂, 7 ♀.)

This very striking species was discovered on the Mount Arthur Tableland, at an elevation of about 4,000 feet above the sea-level. Although apparently common in that locality it has not, so far, been found elsewhere.

The expansion of the wings is about 1½ inches. The forewings, which have the costa slightly arched and the apex rather prominent, are bright ochreous with rich reddish-brown markings; the basal patch is faintly indicated by two indistinct transverse lines; the median band is broad, very distinct with a very strong double projection on its outer edge; the costal half of the median band is clear ochreous and contains an elongate black discal spot; the terminal area is strongly shaded with pinkish-brown except on the apical patch and along the edge of the median band; there is a fine wavy whitish subterminal line; the cilia are crimson-brown barred with darker brown. The hind-wings are bright ochreous with brown terminal marks and crimson-brown cilia.

In the female all the markings are much paler and less distinct than in the male.

The perfect insect appears at the end of January, and frequents the limestone valleys on the Mount Arthur Tableland. It is probably out for a very brief season, as I have only once met with it, when, however, it was very common.

XANTHORHOE CLARATA.

(*Larentia clarata*, Walk., Cat. xxiv., 1197; Butl., Cat. N.Z. Lep. pl. iii., 14; *Cideria pyramaria*, Gn., Ent. Mo. Mag. v., 93. *Larentia clarata*, Meyr., Trans. N.Z. Inst. xvi., 79.)

(Plate XIV., fig. 26 ♂, 27 ♀.)

This very conspicuous species has occurred at Mount Egmont, Waimarino, Waiouru, and on the Tararua Range in the North Island. It is common and generally distributed throughout the South Island.

The expansion of the wings of the male is nearly 1½ inches; of the female about 1½ inches. The forewings are pale ochreous-brown with numerous fine wavy dark brown and broad white transverse lines; there are two oblique white lines near the base; a broad wavy white line along the outer edge of the median band with a double prominent projection near the middle; a very wavy, somewhat broken white subterminal line and a curved apical streak; between the white lines there are rather faint wavy dark brown, or blackish, lines; two or three white spots of very variable size are situated in the middle of the median band, the uppermost containing a black discal dot. The hind-wings are bright ochreous. The cilia of all the wings are whitish-ochreous strongly barred with dark brown.

This species varies considerably in the intensity of the colouring as well as in the breadth of the white markings.

The perfect insect appears from November till March. It frequents open grassy places at elevations ranging from 2,000 to 4,500 feet, and is often very abundant in these situations. In the extreme south it has been taken on the tussock plains near the sea-level.

XANTHORHOE DECLARATA.

(*Xanthorhoe declarata*, Prout., Trans. N.Z. Inst. xli., 122.)

(Plate XIV., fig. 25 ♂.)

This species, which is very closely allied to *X. clarata*, was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago. It has also occurred plentifully on the lower slopes of Ben Lomond, near Queenstown, Lake Wakatipu, and on the Takitimu Mountains.

The expansion of the wings is about $1\frac{1}{2}$ inches. It is very like *X. clarata* but considerably paler and greyer; the sub-terminal white line of the fore-wings is much straighter and the hind-wings are greyish-white with a slightly darker basal area and two broad subterminal bands. The cilia of all the wings are whitish barred with greyish-brown.

There is considerable variation in size and, in the female, in markings.

The perfect insect appears from November till February, and is found in tussock openings amongst beech trees on the mountain side, at elevations from 1,500 to 4,000 feet above the sea-level. It may be easily passed over as a wasted specimen of *X. clarata*.

XANTHORHOE CATAPHRACTA.

(*Larentia cataphracta*, Meyr., Trans. N.Z. Inst. xvi., 79.)

(Plate XIV., fig. 28 ♂, 29 ♀.)

This large and very handsome species has occurred in the South Island on Mount Arthur, Arthur's Pass, Lake Guyon, Hunter Mountains, and on the mountains at the head of Lake Wakatipu.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches, of the female $1\frac{1}{2}$ inches. This insect is larger and paler in colouring than *X. clarata* with more oblique and straighter markings; there is a broad longitudinal pale reddish-ochreous band along the costa in which the transverse lines almost disappear. The hind-wings are very pale whitish-ochreous. All the cilia are whitish with the darker bars either absent or very indistinct. The female is much duller and paler than the male.

The perfect insect appears from December till March, and frequents grassy slopes on the mountain sides, at elevations of from 3,000 to 4,000 feet above the sea-level. Although sometimes met with in considerable numbers, it is much rarer and more local than *X. clarata*.

XANTHORHOE STRICTA.

(*Xanthorhoe stricta*, Philp., Trans. N.Z. Inst. xlvii., 195.)

(Plate XIV., fig. 23 ♂, 24 ♀.)

This very distinct species was discovered by Mr. W. G. Howes on Bold Peak, at the head of Lake Wakatipu. It has also occurred on the Hunter Mountains, at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female $1\frac{1}{2}$ inches. The fore-wings of the male are cream-coloured, very slightly tinged with pinkish; there is a small slightly darker basal patch, edged with blackish; the first line is blackish wavy, very oblique, double, in some places treble; there is a minute discal dot; the second line is very oblique, strongly waved, very broad and shaded inwards, with two or three fainter lines towards the disc; the subterminal line is treble, slightly waved, parallel with the termen which is very oblique; there is a short oblique streak from the apex and a terminal series of black dots. The hind-wings are whitish-ochreous with several very faint wavy pale grey transverse bands and a terminal series of black dots. In the female the fore-wings are pale brown with many fine wavy oblique darker brown transverse lines similar to those of the male but very much fainter and more numerous.

The perfect insect appears in January and February, and frequents the edges of the forest.

Described and figured from specimens in the Dominion Museum.

XANTHORHOE DISSIMILIS.

(*Venusia dissimilis*, Philp., Trans. N.Z. Inst. xli., 118.)

(Plate XIII., fig. 8 ♂.)

This rather dull-coloured but very distinct species was discovered by Mr. M. O. Pasco on Ben Lomond, Lake Wakatipu. It has also occurred at Arthur's Pass, at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is almost $1\frac{1}{2}$ inches. The fore-wings, which have the apex very acute, are ochreous-brown slightly purplish-tinged; there are two fine wavy lines extending almost from the apex to the dorsum at $\frac{1}{2}$ sometimes enclosing an extremely elongate darker brown area; the other markings are obscure consisting of several fine slightly wavy lines parallel to the above. The hind-wings, which are shaped very like those of *Epirrhantis hemipteraria*, are brownish-white becoming purplish-brown towards the termen which is strongly waved; there is a conspicuous light bordered wavy blackish line across the middle and several very faint brownish lines on each side of this. The ground colour of the wings in the female is greyish-ochreous.

The perfect insect appears from December till February, and frequents sub-alpine scrub.

This species strongly recalls *Eucymatogae anguligera* in its superficial appearance.

XANTHORHOE FRIVOLA.

(*Xanthorhoe frivola*, Meyr., Trans. N.Z. Inst. xlv., 26.)

This species was discovered by Mr. Philpott near Invercargill.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches. Head and thorax ferruginous-ochreous. Palpi $2\frac{1}{2}$. Antennal pectinations a 4, b 6. Abdomen whitish-ochreous mixed with brownish-ochreous. Fore-wings triangular, costa posteriorly arched, apex obtuse, termen somewhat bowed, rather oblique; whitish-ochreous tinged with grey, towards costa light yellow-ochreous; costa suffused with fuscous towards base; first two fasciae faintly indicated with fuscous on dorsal half; third and fourth fasciae slender, fuscous, third curved, fourth stronger, shortly angulated-prominent in middle; a dark-fuscous discal dot between these; a faint fuscous praesubterminal shade, and oblique subapical mark; a fuscous terminal line; cilia ochreous-

whitish tinged with brownish. Hind-wings rather elongate, termen rounded; pale-yellowish, towards base faintly greyish-tinged; cilia as in fore-wings.

Apparently intermediate between *imperfecta* and *recta*, but distinct from either.

I am unacquainted with this species which Mr. Philpott is unable to identify. The above particulars have been taken from the original description.

XANTHORHOE DIONYSIAS.

(*Xanthorhoe dionysias*, Meyr., Trans. N.Z. Inst. xxxix., 108.)

(Plate XIV., fig. 9 ♂.)

This rather distinctly-marked species was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago.

The expansion of the wings is nearly $1\frac{1}{4}$ inches. The fore-wings are rather elongate with the costa strongly arched and the termen oblique; very pale ochreous-brown tinged with reddish on the costa and termen; there are numerous oblique wavy brownish-black transverse lines; two along the outer edge of the basal patch; three, very distinct, on the median band; two strongly waved beyond this and a series of rather cloudy sub-terminal marks; the cilia are pale reddish-ochreous barred with blackish. The hind-wings are pale ochreous-brown with three cloudy grey transverse lines; the cilia are pale ochreous barred with blackish. The underside of all the wings is dark reddish-ochreous with conspicuous wavy white and blackish-brown transverse lines.

The perfect insect appears in February, and frequents open mountainous country at elevations of about 4,000 feet above the sea-level.

XANTHORHOE HELIAS.

(*Xanthorhoe helias*, Meyr., Trans. N.Z. Inst. xvi., 81.)

(Plate XIV., fig. 10 ♂.)

This species, which is closely allied to *X. dionysius* and *X. recta*, has occurred at Hurunui, Dunedin and on The Hump and Mount Cleughearn in Southland, at an elevation of about 3,500 feet.

The expansion of the wings is about $1\frac{3}{4}$ inches. It differs from *X. dionysius* in the following respects:—Generally paler in colour, more suffused with reddish-ochreous and larger in size with the transverse lines tending to become confluent, especially on the outer edge of the median band, which has a decided projection near the middle, and is sometimes broadly edged with white; there is a strongly scalloped whitish transverse line on the subterminal area. The cilia of all wings are reddish-ochreous without any dark bars. The underside of the hind-wings is ochreous with a faint blackish median line and discal dot, but is not distinctly marked as in *X. dionysius*.

A variety in which the wings are much suffused with blackish-brown occurs on The Hump, Southland, and has been described by Mr. Philpott as *X. helias obscura*.*

The perfect insect appears in January, and frequents scrubby ravines on the mountain side.

I am indebted to Messrs. J. H. Lewis and A. Philpott for specimens.

*Trans. N.Z. Inst., liii., 338.

XANTHORHOE RECTA.

(*Xanthorhoe recta*, Philp., Trans. N.Z. Inst. xxxvii., 330.)

(Plate XIV., fig. 19 ♂.)

This species, which is very closely allied to *X. helias* and *X. dionysius*, was discovered by Mr. J. H. Lewis at Ida Valley, Central Otago. It has also occurred at Dunedin and Invercargill.

The expansion of the wings is about $1\frac{1}{4}$ inches. The fore-wings are greyish-ochreous much clouded with reddish-ochreous especially on the costal and terminal areas; the transverse lines are almost straight and oblique except the outer edge of the median band which is waved with two projections near the middle; it is followed by a conspicuous creamy-white band; there is a whitish mark on the costa before the apex. The hind-wings are clear ochreous above and dark reddish-ochreous underneath. All the wings have a series of minute terminal marks and the cilia are pinkish-ochreous without bars. According to Mr. Lewis the female is semi-apterous.

The perfect insect appears in February and March. It occurs commonly on open tussock country in Central Otago.

Described and figured from specimens captured by Mr. J. H. Lewis.

XANTHORHOE AEGROTA.

(*Selidosema aegrota*, Butl., Cist. Ent. ii., 499; *Larentia aegrota*, Meyr., Trans. N.Z. Inst. xvi., 80.)

(Plate XIV., fig. 18 ♂.)

This rather inconspicuous species has occurred in the North Island at several localities in the Wellington District. It is probably generally distributed throughout the South Island, and has also occurred at Stewart Island.

The expansion of the wings is about $1\frac{1}{4}$ inches. The fore-wings are dull ochreous-brown; there are several indistinct wavy blackish lines near the base, a black dot above the middle, then three or four more lines, followed by a cloudy shading on the termen. The hind-wings are pale ochreous-brown. The cilia of all the wings are dull ochreous-brown barred with blackish. There is usually a deep brown patch near the dorsum on the underside of the hindwings, followed by a broad reddish-brown subterminal band traversed by several wavy darker lines.

This species varies considerably in the intensity of the markings on both upper and under surfaces, and some specimens are almost without markings.

The perfect insect appears from November till March, and in the South Island is often very common. It usually frequents rather open situations in the neighbourhood of forest, and I have often observed it amongst bushes of "Wild Irishman" (*Discaria toumatou*.) It is extremely abundant on the banks of the Dart River, at the head of Lake Wakatipu.

XANTHORHOE ALBILINEATA.

(*Xanthorhoe albilineata*, Philp., Trans. N.Z. Inst. xlvii., 194.)

(Plate XIV., fig. 17 ♂.)

This very distinct species was discovered by Mr. Philpott on Table Hill, Stewart Island, at an elevation of about 2,000 feet above the sea-level.

The expansion of the wings is $1\frac{1}{4}$ inches. All the wings are pale ochreous. The fore-wings have a black discal dot; the median band is clouded with grey and its edges clearly indicated by fine wavy blackish lines; there is a cloudy blackish patch below the apex. Both wings have a terminal series of double dots. On the underside the fore-wings are deeply clouded with grey, except on the costa and apex, and the hind-wings have two very conspicuous broad, white-edged, brown streaks; the first across the middle of the wing from the base to the middle of the termen, the second along the dorsum.

The perfect insect appears in December, and is found on open hill tops.

XANTHORHOE EXORIENS.

(*Larentia exoriens*, Prout., Proc. N.Z. Inst. xliv., 54.)

(Plate XIV., fig. 8 ♂.)

This species was discovered by Mr. Howes at Glenorchy, Lake Wakatipu. It has also occurred at Nevis, Central Otago.

The expansion of the wings is $1\frac{1}{4}$ inches. All the wings are ochreous, the fore-wings being strongly tinged with reddish on the costa and extreme base; the median band consists of four very irregular faint blackish lines, the second and third lines forming three distinct loops; there is a distinct blackish discal dot and the outer edge of the median band is very strongly waved, with distinct projections above and below the middle; the subterminal area is broad with one or two very faint cloudy marks; all the wings have a terminal series of minute brown marks, and all the cilia are plain ochreous without bars. The underside of the hind-wings is dull reddish-ochreous without distinct markings.

The perfect insect appears in March, and frequents open grassy country.

XANTHORHOE IMPERFECTA.

(*Xanthorhoe imperfecta*, Philp., Trans. N.Z. Inst. xxxvii., 330, pl. xx., 6.)

(Plate XIV., fig. 16 ♂.)

This very distinct species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also occurred at Dunedin.

The expansion of the wings is about $1\frac{1}{4}$ inches. All the wings are bright ochreous. The fore-wings are tinged with reddish towards the apex and clouded with darker ochreous on the terminal area; there are several brown bars on the costa each usually followed by a whitish mark; in the female these bars are very faintly produced across the wing as transverse lines; there is a brownish discal dot. The cilia are ochreous barred with blackish.

The perfect insect appears in December and January, and frequents low-lying swampy forest. It is a rare and local species.

I am indebted to Mr. Philpott for specimens.

XANTHORHOE ORARIA.

(*Xanthorhoe oraria*, Philp., Trans. N.Z. Inst. xxxv., 248, pl. xxxii., 6.)

(Plate XIV., fig. 30 ♂.)

This very plain-looking species was discovered by Mr. Philpott at New River, near Invercargill. It has also been

found on Ben Lomond and Mount Earnslaw, Lake Wakatipu, at elevations of about 4,000 feet above the sea-level, as well as on Stewart Island.

The expansion of the wings of the male is slightly over 1 inch. All the wings are pale ochreous, the fore-wings being usually a little darker and occasionally very faintly tinged with dull greenish; there is a distinct blackish discal dot and the edges of the median band are rarely indicated by obscure wavy greyish transverse lines.

The female is unknown at present, and may possibly be semiapterous.

According to Mr. Philpott specimens from Ben Lomond are longer-winged than the coastal form, and those from Mount Earnslaw are still longer.

The perfect insect appears from November till April, occurring plentifully amongst tussock grass on sand-hills.

Described and figured from specimens kindly given to me by Mr. Philpott.

XANTHORHOE SERICODES.

(*Xanthorhoe serICODES*, Meyr., Trans. N.Z. Inst. xlvii., 202.)

(Plate XIV., fig. 20 ♂.)

This species, which is very closely allied to *Xanthorhoe oraria*, was discovered on the lower slopes of Mount Earnslaw, Lake Wakatipu, at an elevation of about 3,500 feet above the sea-level.

The expansion of the wings of the male is about $1\frac{1}{4}$ inches. The fore-wings are very glossy, dull ochreous tinged with brownish; there is a blackish discal dot and faint traces of a wavy transverse line at about $\frac{2}{3}$; a cloudy greyish spot is sometimes situated at the apex. The hind-wings are uniform dull ochreous.

The female is unknown at present, and may perhaps be semi-apterous.

The perfect insect appears in January, and frequents tussock openings amongst sub-alpine scrub.

XANTHORHOE NEPHELIAS.

(*Larentia nephelias*, Meyr., Trans. N.Z. Inst. xvi., 78; *Xanthorhoe subflava*, Howes, ib., xlix., 274.)

(Plate XIV., fig. 45 ♂.)

This large and very distinct species has occurred at Arthur's Pass.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are very pale whitish-ochreous darker on the costa where there are no grey markings; the basal area as far as the outer edge of the median band is clouded and speckled with very pale grey, the first and second lines being slightly darker; there is a broad wavy whitish-ochreous subterminal band and a grey terminal band, often composed of a double series of confluent spots. The hind-wings are pale ochreous with a terminal series of elongate pale grey spots. The cilia are whitish-ochreous faintly barred with grey.

The perfect insect appears in February. It frequents open tussock country above the limits of ordinary forest, sometimes attaining an elevation of 4,600 feet above the sea-level.

XANTHORHOE OXYPTERA.

(*Xanthorhoe oxyptera*, Huds., Sub. Ant. Islds. of N.Z. i., 67, pl. 11., 23.)

(Plate XIII., fig. 50 ♂.)

This very interesting species was discovered by Captain Dorrien-Smith at the head of the northern arm of Carnley Harbour, Auckland Island, during the visit of the scientific expedition in November, 1907.

The expansion of the wings is $1\frac{1}{2}$ inches. The head, thorax, and abdomen are brownish-ochreous, the last-named with two blackish spots on the back of each segment. The palpi are slender, nearly as long as the head, whitish-ochreous. The antennae are whitish-ochreous, with long black pectinations extending to the apex. The fore-wings are elongate, narrow, with the apex extremely acute and the tornus rounded, rather dark greyish-brown, very glossy, with the bases of the veins and a broad costal band pale brownish-ochreous; a small black discal dot. Hind-wings narrow, apex and tornus rounded, greyish-brown, very glossy, without markings except a few extremely minute blackish marginal dots. On the underside all the wings are whitish-ochreous, the costa of the fore-wing and the whole of the hind-wing darker; the basal portions of all the veins are strongly marked in blackish-brown. The cilia of all the wings are very pale-ochreous.

XANTHORHOE MNESICHOLA.

(*Larentia mnesichola*, Meyr., Trans. N.Z. Inst. xx., 56.)

(Plate XIV., fig. 31 ♂, 32 ♀.)

This very obscurely-marked species has occurred in the South Island on Mount Arthur, at elevations of from 3,500 to 4,500 feet.

The expansion of the wings is 1 inch. The fore-wings are pale brownish-ochreous, and rather glossy; there is a series of minute black dots at the base, a second series at about one-third, then a cloudy curved band, slightly darker than the rest of the wing, followed by a third series of minute black dots; a fourth series is situated on the subterminal area. The hind-wings are very pale brownish-ochreous.

The perfect insect appears in January and February, and frequents sub-alpine scrub.

XANTHORHOE OCCULTA.

(*Xanthorhoe occulta*, Philp., Trans. N.Z. Inst. xxxv., 248, pl. xxxii., 5.)

(Plate XIV., fig. 14 ♂, 15 ♀.)

This dull bronzy-looking species, which was discovered by Mr. Philpott, has occurred on Mount Ruapehu, and on the Tararua Ranges in the North Island, and at Mount Arthur, Arthur's Pass, Otira, Dunedin and Invercargill in the South Island. It has also been found on Stewart Island.

The expansion of the wings is about 1 inch. The fore-wings, which have the costa straight and the apex acute, especially in the female, are deep bronzy-ochreous-brown strongly tinged with reddish in the female; the basal area and median band are clouded with grey; the veins are faintly marked in purplish-grey and at each point where they enter and leave the median band there is a confluent dark brown and white dot. The hind-wings are pale ochreous, tinged with reddish in the female; there is a median series of grey dots on the veins.

This species varies considerably in size and slightly in the depth of the colouring.

The perfect insect appears from October till February, and is attracted by light. In the North Island and northern portions of the South Island it seems to be a sub-alpine species, having been found in forest glades between 3,000 and 4,000 feet above the sea-level. In the extreme south it occurs in the lowlands.

XANTHORHOE STINARIA.

(*Camptogramma stinaria*, Gn., Ent. Mo. Mag. v., 92; *Larentia stinaria*, Meyr., Trans. N.Z. Inst. xvi., 78.)

(Plate XIV., fig. 13 ♂.)

This very bright-looking species has occurred in the North Island at Waiouru and Puketitiri (Napier), and in the South Island at Mount Grey, Christchurch, Mount Hutt, Otira, Dunedin, Queenstown, Lake Wanaka, and Otatara, near Invercargill.

The expansion of the wings is barely 1 inch. The fore-wings are bright ochreous-brown; there is an oblique dark-edged white line running from the dorsum near the base towards the middle of the wing, and a very conspicuous, oblique, slightly waved dark-edged white line at about $\frac{1}{2}$; the space between these lines is often considerably darker and there is generally a series of faint subterminal dots and a distinct terminal shading. The hind-wings are ochreous, without markings. The female is paler and more uniform in colour than the male.

The perfect insect appears from November till February, and frequents tussock country, or grassy openings in scrubby forest.

Genus 15.—NOTOREAS, Meyr.

Face and palpi roughly hairy. Antennae in ♂ bipectinated. Thorax and femora rough-haired beneath. Fore-wings: areole double. Hind-wings normal.

(Plate C., fig. 43, fore-wing of *Notoreas brephos*.)

This interesting endemic genus, of which we have no less than twenty-three species, comprises a number of gaily coloured little insects, chiefly inhabiting mountain regions. All the species are day-fliers, and most of them only appear during the hottest sunshine. One species is confined to the North Island, eighteen to the South Island, and four are common to both islands.

NOTOREAS SYNCLINALIS.

(*Notoreas synclinalis*, Huds., Trans. N.Z. Inst. xxxv., 244, pl. xxx., 6; Meyr., Trans. Ent. Soc. Lond., 1905, 220.)

(Plate XIV., fig. 33 ♂, 34 ♀.)

This very interesting and remarkable-looking species was discovered by Mr. Philpott at Seaward Moss, near Invercargill. It has also occurred on the hills near Preservation Inlet, at an altitude of about 1,000 feet above the sea-level, at Wyndham, on Longwood Range, and on Stewart Island.

The expansion of the wings is nearly $1\frac{1}{2}$ inches. The fore-wings have the costa broadly bordered with dark greyish-black;

below this there is a longitudinal black streak from the base to a little beyond the middle; next a broad dull-white stripe, followed by a very conspicuous curved black longitudinal stripe, extending from the base of the wing, running parallel to the dorsum towards the termen and curving upwards towards the apex; on its lower side this stripe is very broadly margined with pale grey, a wedge of the grey colour projecting inwards above the middle; the whole of the outer edge of the greyish-white marking is finely margined with black; the lower discal and subterminal portions of the wing are dull yellowish-brown and there is a fine black terminal line. The hind-wings are dark blackish-grey, with an obscure paler median shade. The cilia of all the wings are dark grey, faintly barred with paler grey.

The perfect insect appears from January till March. It frequents mossy swamps near the sea-level, or on flat-topped hills, and is evidently extremely local, although abundant where found. Mr. Philpott states that the specimens from the hills near Preservation Inlet have shorter and narrower wings than those from Seaward Moss.*

NOTOREAS INSIGNIS.

(*Aspilotes insignis*, Butl., Proc. Zool. Soc. Lond. 1877, 393, pl. xliii, 1; *Pasitheia insignis*, Meyr., Trans. N.Z. Inst. xvi, 85. *Notoreas insignis*, lb. xviii, 184.)

(Plate XIV., fig. 47 ♂, 48 ♀.)

This very striking species has been taken in the South Island at Castle Hill, Wedderburn, Central Otago, Mace-town, and Mounts Aurum and Earnslaw, Lake Wakatipu.

The expansion of the wings of the male is 1½ inches, of the female 1¼ inches. The fore-wings of the male are very dark yellowish-brown; in the middle of the wing there is an up-curved pointed white streak from the base to about one-half; there is another straight white streak parallel to the termen and almost touching the apex. The hind-wings are dull orange-brown. In the female the wings are narrower and more pointed; the ground colour of the fore-wings is pale ochreous-grey, of the hind-wings very pale brownish-ochreous; the markings are the same as in the male but are much less distinct.

There is considerable variation in size, as well as in the length and distinctness of the curved basal streak.

The perfect insect appears from January till March, and is found on the bare mountain side, at elevations between 4,000 and 5,000 feet above the sea-level.

NOTOREAS ORPHNAEA.

(*Pasitheia orphnaea*, Meyr., Trans. N.Z. Inst. xvi, 85; *Notoreas orphnaea*, lb. xviii, 184; Huds., ib. xl, 106.)

(Plate XIV., fig. 49 ♂, 50 ♀.)

This very dark-looking species has occurred at Mace-town and on the mountains around Lake Wakatipu. It is probably generally distributed on the mountains in the southern portion of the South Island.

The expansion of the wings of the male is about 1½ inches; of the female 1¼ inches. The fore-wings of the male are very dark greyish-black, speckled with paler grey, the dark and lighter colouring forming numerous rather obscure wavy transverse bands; there are several small black marks on the veins. The hind-wings are dark-grey, speckled with paler grey on three

obscure transverse bands. The cilia of all the wings are greyish-white, strongly barred with blackish-grey. The body is black; the head and thorax are densely clothed with long black hair; the antennae are heavily bipectinated. The female is much paler, with numerous obscure blackish transverse lines on both fore- and hind-wings; the fore-wings are very faintly tinged with yellowish-brown towards the base and termen, and all the wings have a terminal row of small but conspicuous oblong black marks. The antennae are simple, and the head and thorax are moderately clothed with short black hairs.

The perfect insect appears from November till February, and frequents bare mountain sides, at elevations of about 4,000 feet above the sea-level. It is imitative in colour of the dark lichen-grown rocks. In habits and superficial appearance it very closely resembles *Dasyuris hectori* from which, however, it may be at once distinguished by the hairy clothing of the head and thorax, the strongly bipectinated antennae of the male and the absence of distinct white transverse lines on the underside of both fore- and hind-wings.

NOTOREAS VILLOSA.

(*Notoreas villosa*, Philp., Trans. N.Z. Inst. xlix., 241.)

(Plate XV., fig. 23 ♂, 24 ♀.)

This fine species was discovered by Mr. Philpott on The Hump and on Mount Cleughearn, Southland, at elevations of between 3,000 and 4,000 feet above the sea-level.

The expansion of the wings of the male is about 1½ inches; of the female barely ¾ inch. The pectinations of the antennae of the male are extremely long. The fore-wings are bright ochreous-brown with white and blackish markings; the costal edge and extreme base are densely sprinkled with black and white scales; there is a strong oblique blackish-edged white bar on the dorsum at about ¼ not reaching to the costa; a wavy oblique white band at about ⅓, strongly margined with black towards the base; two faint blackish lines follow this, and a very conspicuous wavy subterminal white line. The hind-wings are very pale bluish-grey speckled with black; there is a narrow black transverse line at about two-thirds followed by a broad subterminal band and a still broader terminal band. The cilia of all the wings are whitish-ochreous faintly clouded with grey at the base and strongly barred with black. The female has the wings much abbreviated and is incapable of flight. All the wings are whitish-ochreous thinly sprinkled with blackish scales and the antennae are filiform.

The perfect insect appears in December and January, and is found on open grassy country on mountains. It is apparently confined to the extreme south of New Zealand.

I am indebted to Mr. Philpott for specimens of this interesting insect.

NOTOREAS OPIPARA.

(*Notoreas opipara*, Philp., Trans. N.Z. Inst. xlvii., 196.)

(Plate XV., fig. 16 ♂.)

This very handsome, black-looking, little species was discovered by Mr. Philpott at Table Hill, Stewart Island. It has also occurred on Mount Rekiagua in the same locality.

*Proc. N.Z. Inst. xlv., 431.

The expansion of the wings is nearly $\frac{3}{4}$ inch. The fore-wings are black sparsely speckled with grey; the transverse lines are deep red edged with black, sometimes almost entirely black; there is a narrow basal band followed by a broken reddish line; the median band is wide bordered with thick red and black wavy lines; the central area is grey with a black discal dot; there is a very distinct red subterminal band and a series of dull reddish terminal dots. The hind-wings are deep greyish-black with a wavy paler grey line and black lunules. The cilia of all the wings are pale ochreous barred with greyish-black. In some specimens the deep red markings are almost completely displaced by black.

The perfect insect appears at the end of December and in January. It frequents open hill-tops.

NOTOREAS ANTHRACIAS.

(*Larentia anthracias*, Meyr., Trans. N.Z. Inst. xvi., 84; *Xanthorhoe anthracias*, Huds., N.Z. Moths, 67.)

(Plate XIV, fig. 35 ♂.)

This species has occurred at Mount Hutt, Vanguard Peak, Mount Aurum, Lake Wakatipu, Takitimu Mountains and The Hump, Southland.

The expansion of the wings is about 1 inch. The fore-wings are blackish-grey speckled with paler grey and with greyish-white markings; there is a small basal patch margined by a blackish and whitish oblique wavy line; the inner edge of the median band is oblique also margined with blackish and white wavy lines; there are two wavy lines in the middle of the median band and a conspicuous elongate discal dot; the outer edge of the median band has a strong rounded projection above the middle; it is margined with two blackish and two whitish lines; the veins on the subterminal area are dotted in black and the terminal area is slightly paler. The hind-wings are grey with numerous faint wavy lines. All the cilia are white barred with grey.

The perfect insect appears in December, January and February. It frequents open mountain sides at elevations of from 2,000 to 5,400 feet above the sea-level.

Described and figured from a specimen from the Fere-day collection.

NOTOREAS INCOMPTA.

(*Notoreas incompta*, Philp., Trans. N.Z. Inst., 1, 126.)

(Plate XV, fig. 48 ♂.)

This interesting species was discovered by Mr. R. Gibb on the Kepler Mountains, at an elevation of 3,000 feet above the sea-level. It has also occurred on Arthur's Pass, and on the Hunter Mountains, near Lake Manapouri.

The expansion of the wings is $1\frac{1}{4}$ inches. The fore-wings are whitish very densely speckled with black and with numerous jagged black lines darkest on the costa; the basal patch median band and terminal area are considerably darker than the spaces between them; there is an ochreous-brown clouding beyond the basal patch and the median band is also strongly clouded with ochreous-brown; the veins are irregularly dotted in black and white. The hind-wings are dull grey more or less speckled with white, with obscure ochreous-brown and whitish median bands; the veins are very obscurely dotted in black and white. The cilia of all the wings are whitish barred with black.

The perfect insect appears in January, and usually frequents bare rocks where its colouring is no doubt pro-

tective. At Arthur's Pass I found it in considerable numbers amongst *Helichrysum*, at about 4,000 feet above the sea-level.

Described and figured from the type specimen in the Southland Museum prior to my discovery of the insect at Arthur's Pass.

NOTOREAS MECHANITIS.

(*Pasithea mechanitis*, Meyr., Trans. N.Z. Inst. xvi., 86; *Notorecus mechanitis*, ib. xviii., 184; ib. xliiii., 59.)

(Plate XIV, fig. 38 ♂.)

This insect has occurred in the South Island at Mount Arthur, Arthur's Pass, Mount Hutt, Ben Lomond and the Hunter Mountains.

The expansion of the wings is about $\frac{3}{4}$ inch. All the wings are dark brownish-black. The fore-wings have an almost straight transverse yellow or white stripe near the base, edged with black towards the body; a rather wavy stripe at about one-third, edged with black towards the termen; then several irregular yellowish or white spots or marks, followed by a very distinct white stripe, projecting towards the termen near the middle; there is a broken fine yellow subterminal line. The hind-wings have a shaded white or yellow transverse line near the base, another near the middle, a third, considerably finer and often broken, near the termen. The cilia of all the wings are white shaded with grey near the base, but with no distinct bars.

The perfect insect appears from January till March, and flies with great activity in the hottest sunshine. It frequents grassy mountain sides at elevations ranging from 3,000 to 4,500 feet above the sea-level, and in these situations it is often very abundant.

NOTOREAS ATMGRAMMA.

(*Notoreas atmgramma*, Meyr., Trans. N.Z. Inst. xliii., 59.)

(Plate XIV, fig. 36 ♂, 37 ♀.)

This species, which appears to be the North Island representative of *N. mechanitis*, has occurred on the Tararua Ranges, near Wellington.

The expansion of the wings of the male is slightly under 1 inch; of the female a little over 1 inch. It differs from *N. mechanitis* in its larger size; more obscure colouring, especially in the male; absence of the strong golden yellow suffusion, and colour of the underside of the hind-wings which are wholly yellow, except the black discal dot and rarely one extremely faint line, whereas in *N. mechanitis* they are marked with strong black lines.

The perfect insect appears in January and February, and frequents open grassy country between 4,000 and 5,000 feet above the sea-level.

NOTOREAS PARADELPHA.

(*Pasithea paradelpha*, Meyr., Trans. N.Z. Inst. xvi., 86; *Notorecus paradelpha*, ib. xviii., 184.)

(Plate XIV, fig. 40 ♂.)

In the South Island this insect has occurred on Mount Arthur, Arthur's Pass, Hunter Mountains, and Ben Lomond, Lake Wakatipu, at elevations of from 3,600 to 5,000 feet.

The expansion of the wings is about 1 inch. This species is stated to be distinguished from closely allied forms by the barred cilia, the absence of any clear yellow colouring, the less prominent angulation of the post-median line and the more elongate wings.

The perfect insect appears from November till February. In habits it exactly resembles *Notoreas mechanitis*.

NOTOREAS ARCUATA.

(*Notoreas arcuata*, Philp., Trans. N.Z. Inst. liii., 338.)

(Plate XIV., fig. 39 ♀.)

This species, which is very closely allied to both *Notoreas mechanitis* and *N. paradelpha*, has occurred on Arthur's Pass, at an elevation of about 5,000 feet above the sea-level, and on the St. Arnaud Range, near Nelson.

The expansion of the wings of the female is about 1 inch. It differs from *Notoreas mechanitis* in having the costa somewhat more arched and the cilia distinctly barred with blackish and from both *Notoreas mechanitis* and *N. paradelpha* in having the outer edge of the median band waved but not strongly angulated above the middle; there is a very fine wavy white subterminal line. As only the female is known at present it may be necessary to transfer the species to the genus *Dasyuris* when the male is discovered.

The perfect insect appears from December till February.

Described and figured from a specimen taken by Mr. Howes.

NOTOREAS GALAXIAS, n. sp.

(Plate XV., fig. 29 ♀.)

This rather conspicuous species was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago, at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is about 1 inch. All the wings are brownish-black with broad creamy-white markings; there is a broad oblique band between the basal patch and median band containing a series of four small blackish blotches; the outer edge of the median band is bordered by a very broad creamy-white band strongly angulated outwards near the middle; a similar but broader and yellower band crosses the middle of the hind-wings; there is a fine wavy subterminal line with a conspicuous whitish spot in the middle of the termen of both fore- and hind-wings. The head and body are blackish sprinkled with whitish scales; the palpi black with the base of the apical joint white. The markings on the underside resemble those above except that the area of creamy-white colouring is very much greater.

The perfect insect appears in February, and may be looked for on high open country.

Described and figured from the unique specimen kindly given to me by Mr. Lewis.

NOTOREAS ISOLEUCA.

(*Notoreas isoleuca*, Meyr., Trans. N.Z. Inst. xliii., 59.)

(Plate XV., fig. 1 ♀.)

This species, which is extremely closely allied to the preceding, has occurred on the mountains around Arthur's Pass and on Ben Lomond, at an altitude of about 4,600 feet above the sea-level.

It is a smaller and shorter-winged insect with little or no yellowish admixture; the lines are white, the first curved, the second angulated in the middle, the others slender and sometimes partially obsolete. The cilia have the basal half dark brown, the outer half whitish obscurely barred with grey.

The perfect insect appears from January till March, and is stated to frequent higher altitudes than *N. mechanitis*.

NOTOREAS HEXALEUCA.

(*Dasyuris hexaleuca*, Meyr., Trans. N.Z. Inst. xlii., 103.)

This neatly-marked little species was discovered by Mr. Philpott on Ben Lomond, Lake Wakatipu. It has also occurred on Flagstaff Hill, near Dunedin.

The expansion of the wings is nearly $\frac{1}{2}$ inch. All the wings are deep brownish-black with wavy ochreous-white transverse lines. The fore-wings have six lines; the first cloudy, ill-defined, the second and third nearly straight, the third rather thick, the fourth fine, angulated in disc, the fifth thick, rather curved outwards in disc, the sixth slender, interrupted, curved, very near termen on lower half; the cilia are white barred with dark grey. The hind-wings have the basal area speckled with white and three ochreous-white transverse streaks; the first before the middle narrow somewhat angulated in disc with a distinct prominence from angle, the second at $\frac{2}{3}$ rather broad, bent in disc, the third rather narrow, waved, curved and interrupted; the cilia are white with a broad brownish-grey basal line.

This species is extremely similar to both *N. isoleuca* and *N. mechanitis*. It is stated to be distinguished by the antemedian white line of fore-wings which is curved in *N. isoleuca*, straight in *hexaleuca*; median angled in *hexaleuca* straight in *isoleuca*; and so on. The thorax is much more hairy above in *isoleuca* than in *hexaleuca*. *N. hexaleuca* is smaller than *N. mechanitis* with relatively longer antennal pectinations.

The perfect insect appears from November till March. It occurs sparingly on open hillsides, from about 1,000 to 3,500 feet above the sea-level.

Described from a specimen in Mr. Philpott's collection.

NOTOREAS ORTHOLEUCA.

(*Notoreas ortholeuca*, Huds., Ent. Mo. Mag. lix., 129.)

(Plate LI. fig. 17 ♂.)

This small and very distinctly-marked species was discovered by Mr. F. S. Oliver on Stoney Peak, near Glenorehy, at the head of Lake Wakatipu.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate with the apex produced and the termen rather oblique; black, with three almost straight white transverse bands; the first near the base narrow almost uniform in breadth; the second before the middle, slightly dilated in the centre; the third from beyond the middle of costa to dorsum just before tornus, very slightly curved, strongly dilated in disc; there is a very obscure interrupted subterminal line from before apex, almost reaching as far as the middle of termen. The hind-wings are black with a broad white band beyond middle, strongly dilated in disc; there are traces of a subterminal line. All the cilia are whitish with very indistinct whitish bars.

The perfect insect appears in January, and evidently frequents high mountains between 6,000 and 7,000 feet above sea-level.

NOTOREAS ISCHNOCYMA.

(*Notoreas ischnocyma*, Meyr., Trans. Ent. Soc. Lond., 1905, 221; *Notoreas isolenca*, Huds., N.Z. Moths, 72, pl. viii., 27, nec. Meyr.)

(Plate XV., fig. 30 ♀.)

This little species has been taken in the South Island on the Craigieburn Range, near Castle Hill.

The expansion of the wings is about $\frac{1}{2}$ inch. *All the wings are very dark blackish-brown; the fore-wings have five slender wavy white transverse lines. The hind-wings have three white transverse lines, the first near the base, the second near the middle, and the third, which is very slender and considerably broken, near the termen. The cilia of all the wings are white, barred with blackish-brown.*

This species is distinguished from the allied forms by the slender waved second line.

The perfect insect appears in January, and frequents stunted vegetation at an elevation of about 5,600 feet above the sea-level.

NOTOREAS NIPHOCRENA.

(*Pasitheca niphocrena*, Meyr., Trans. N.Z. Inst. xvi., 88. *Notoreas niphocrena*, ib. xviii., 184.)

(Plate XIV., fig. 42 ♂, 43 ♀.)

This very bright-looking species has occurred in the North Island on Mount Hector and Mount Dundas, Tara-rua Range. In the South Island it has been found on the Mount Arthur Tableland, Arthur's Pass, and Bold Peak, Lake Wakatipu, at elevations of about 4,500 feet above the sea-level.

The expansion of the wings of the male is $1\frac{1}{4}$ inches; of the female barely 1 inch. *The fore-wings are very bright reddish-brown; there is a small basal patch speckled with blackish and a slightly darker sub-basal area; the median band is bounded by two very conspicuous blackish-edged white lines; the first waved convex towards the termen; the second also waved, with a strong projection near the middle more pronounced in the female; there is a wavy reddish-yellow subterminal line. The hind-wings are bright orange-brown with wavy darker brown basal, median and terminal bands. The cilia of all the wings are reddish-brown, very indistinctly barred with whitish.*

This species has a strong superficial resemblance to the common *Dasyuris partheniata*, and as it frequents similar localities, it is, perhaps, sometimes passed over for that insect. It may, however, be immediately distinguished by the pectinated antennae of the male, and the much smaller size of the female. In addition, there are also detailed differences in the markings.

The perfect insect appears in January, and frequents open country on high mountains. It is evidently a rare species.

Described and figured from specimens in the Dominion Museum.

NOTOREAS SIMPLEX.

(*Notoreas simplex*, Huds., N.Z. Moths, 74, pl. viii., 26.)

(Plate XIV., fig. 44 ♀.)

A single female specimen of this species was captured on Mount Arthur, near Nelson.

The expansion of the wings is about $1\frac{1}{4}$ inches. *The fore-wings are pale ochreous; there are four broad black transverse bands near the base, edged with white, and separated from one another by yellow spaces of almost equal width; the outermost of these bands is situated a little more than halfway between the base and termen; the last two bands become obsolete before they reach the costa; there are no other markings, except a blackish shading on termen near tornus, which is traversed by an obscure paler wavy subterminal line; the cilia are white barred with blackish and with a blackish basal line. The hind-wings are bright ochreous, without markings; the cilia are ochreous.*

It is possible, that when the male is known, this species will have to be referred to *Dasyuris*.

The perfect insect appears in January.

The type-specimen was taken on the mountain-side, at an elevation of about 4,000 feet.

NOTOREAS FEROX.

(*Fidonia ferox*, Butl., Proc. Zool. Soc. Lond. 1877, 392, pl. xlii., 8; *Pasitheca ferox*, Meyr., Trans. N.Z. Inst. xvi., 88; *Notoreas ferox*, ib. xviii., 184.)

(Plate XV., fig. 34 ♀.)

This species has occurred in the South Island at Castle Hill, West Coast Road, and on Mount Earnslaw, at the head of Lake Wakatipu.

The expansion of the wings is about 1 inch. *The fore-wings are dull greyish-brown, with numerous fine, wavy, dusky lines and a faint discal dot. The hind-wings are orange-yellow speckled with black near the base; there is a rather broad straight transverse black band near the middle, followed by a much finer wavy line; there are three fine, wavy lines parallel with the termen, and the termen itself is finely bordered with black.*

The perfect insect appears in February, and frequents open country on the mountain side at about 4,500 feet above the sea-level. It seems to be a very rare species, but might easily be mistaken, when on the wing, for a pale specimen of the common *N. brephos*.

NOTOREAS BREPHOS.

(*Fidonia brephosata*, Walk., Cat. xxiv., 1037; Butl., Cat. N.Z. Lep. pl. iii., 14; *Larentia catocalaria*, Guen. Ent. Mo. Mag. v., 62; *Fidonia brephos*, Feld., Reis. Nov. pl. cxxix., 5; *Pasitheca brephos*, Meyr., Trans. N.Z. Inst. xvi., 89; *Notoreas brephos*, ib. xviii., 184; *Pasitheca zopyra*, Meyr., Trans. N.Z. Inst. xvi., 89.)

(Plate XV., figs. 32, 33 ♂, varieties.)

This very pretty species is common, and generally distributed throughout the country.

The expansion of the wings is about 1 inch. *The fore-wings are bluish-grey; there is a wavy black line near the base, two similar lines enclosing a very broad median band, with a black*

disical dot; beyond this there is a more or less distinct wavy band of pale grey or brown, and one or two obscure wavy blackish lines near the termen. *The hind-wings are bright orange, dotted with grey near the base and dorsum, with from two to four more or less distinct wavy black transverse lines, generally rather narrow; the termen is moderately broadly bordered with black.*

This insect is rather variable; the ground colour of the fore-wings is often more or less suffused with brown, and the spaces immediately before and beyond the median band are occasionally clouded with brown or deep orange; the terminal band of the hind-wings also varies in width. A small form, often met with on mountains or in river beds, has the fore-wings almost blue with the transverse lines rather indistinct and the hind-wings very bright orange with very narrow black markings. This form was long regarded as a distinct species under the name of *Notoreas zopyra*.

The egg, which is laid on its side, is about one-fiftieth of an inch long, oval, depressed on upper surface, bright orange-brown, covered with fine hexagonal depressions.

The perfect insect appears from December to March. It is very active, and is extremely fond of settling on roads or bare ground in the hot sunshine, darting away on the approach of an enemy. It is very common on the mountains, and is often found at elevations of from 3,000 to 4,000 feet above the sea-level.

NOTOREAS VULCANICA.

(*Pasithea vulcanica*, Meyr., Trans. N.Z. Inst. xvi., 89; *Notoreas vulcanica*, ib. xviii., 184.)

(Plate XV., fig. 35 ♂.)

This very dark richly-coloured species has occurred at Waimarino, Waiouru, on the lower slopes of Mount Ruapehu, and at Makotuku, and the Kaweka Range, in the Hawke's Bay District. In the South Island it has occurred at Macetown.

The expansion of the wings is fully 1 inch. *The fore-wings are rich brownish-black with speckled grey markings; the edge of the basal patch and the inner margin of the median band are bounded by jagged grey lines; the median band is broad, very dark, with an irregular speckled grey centre, containing a conspicuous black discal dot; the subterminal area is mottled with deep brown and traversed by an irregular broken grey subterminal line. The hind-wings are bright orange; there is a very large blackish-brown basal patch, followed by an extremely broad band, then one or two variable transverse lines and a very broad terminal band. The cilia of all the wings are brownish-black with indistinct paler bars.*

The perfect insect appears from January till March, frequenting dry stony places and flying rapidly in hot sunshine. It seems to be extremely local.

NOTOREAS OMICHLIAS.

(*Pasithea omichlias*, Meyr., Trans. N.Z. Inst. xvi., 90. *Notoreas omichlias*, ib. xviii., 184.)

(Plate XIV., fig. 41 ♂.)

This very dull-looking, obscurely-marked species, has occurred on the Tararua Ranges in the North Island, and

on the Mount Arthur Tableland, the mountains around Castle Hill and Lake Wakatipu, and the Hunter Mountains in the South Island.

The expansion of the wings is about 1 inch. *The fore-wings are dark grey in the male, paler grey in the female more or less sprinkled with whitish scales; there are three rather broad speckled brown wavy transverse lines and a faint sub-marginal shading. The hind-wings are brownish-grey, paler in the female.*

Considerable variation exists in the distinctness of the transverse lines, which are often bordered with black and white scales; a discal dot is usually, although not invariably, present on the fore-wings. Specimens from the Hunter Mountains are paler and greyer than the usual form with much more distinct brown markings.

This species has a superficial resemblance to a very dark specimen of *Xanthorhoe semisignata*, but the numerous fine transverse lines, which are always present in that species, will at once serve to distinguish it.

The perfect insect appears in January and February, and frequents open rocky country on high mountains, at about 5,000 feet above the sea-level. It is extremely abundant on the Tararua Range, near Wellington, and apparently is specially characteristic of mountains in the North Island.

NOTOREAS FULVA.

(*Lythria fulva*, Huds., Trans. N.Z. Inst. xxxvii., 357, pl. xxii., 3.)

(Plate XV., fig. 7 ♂.)

This very distinct species was discovered by Mr. J. H. Lewis near Mount Ida, Central Otago, at about 3,500 feet above the sea-level. It has also occurred at Alexandra.

The expansion of the wings is $\frac{3}{4}$ inch. *The fore-wings are pale greyish-brown, with blackish markings; there is a wavy darker band near the base; a broad median band with a strong rounded projection towards termen near the middle, the centre of the median band is paler, and often clouded with reddish-ochreous; it contains a distinct blackish discal dot; there is a wavy subterminal line interrupted by a series of blackish marks on the veins and a dull reddish-ochreous terminal band; the cilia are grey with blackish bars. The hind-wings are dull reddish-ochreous. There are three very obscure blackish transverse lines. The cilia are grey, faintly barred with darker.*

This species varies considerably in the depth of the general colouring, and in the intensity of the markings. Some of the females are very pale, and have the fore-wings much suffused with reddish-ochreous.

The perfect insect appears in March.

Genus 16.—DASYURIS, Guen.

Face and palpi roughly hairy. Antennae in ♂ ciliated. Thorax and femora rough-haired beneath. Fore-wings: areole double. Hind-wings normal.

(Plate C., fig. 42, neurulation of fore-wing of *Dasyuris partheniata*.)

Besides the following eleven endemic species, three are known from Australia, and one from Labrador. Of the eleven New Zealand species, one is confined to the North Island; nine to the South Island, and one common to both islands.

Most of the insects comprised in this genus inhabit high mountains. They are of moderate size and usually gaily coloured with vivid markings. All are very closely allied to *Notoreas*, from which they can only be distinguished by the absence of pectinations in the antennae of the male. This fact has caused considerable difficulty in correctly placing species in the two genera, as in some cases it has happened that male specimens were not available.

DASYURIS HECTORI.

(*Euclydia hectori*, Butl., Proc. Zool. Soc. Lond. 1877, 387, pl. xlii., 4; *Statira hectori*, Meyr., Trans. N.Z. Inst. xvi., 91; *Stathmonyma hectori*, ib. xviii., 184.)

(Plate XV., fig. 21 ♂, 20 ♀, variety.)

This very striking species has occurred in the South Island at Mount Arthur, Mount Hutt, Arthur's Pass, Macetown, the mountains around Lake Wakatipu, and the Hunter Mountains.

The expansion of the wings is $1\frac{1}{2}$ inches. All the wings are dark greyish-black, speckled with bluish-grey scales. The forewings have four or five rather indistinct wavy darker transverse lines, and a very broad darker shading near the termen; there is a fine white mark near the apex, continued as an indistinct wavy subterminal line. The hind-wings have three or four darker transverse bands, and a very broad terminal shading; there are also three or four more or less distinct whitish transverse lines; the cilia are whitish barred with dark grey. On the under side all the wings are dark blackish-grey, traversed by five or six broad wavy whitish lines.

A variety of this insect (fig. 20) is sometimes met with, considerably smaller and paler in colouring than the type. The expansion of the wings in this form is about $1\frac{1}{4}$ inches, and the ground colour is pale grey with darker grey markings. No distinct or constant differences exist, however, which would warrant specific separation from the type, and intermediate forms also occur.

The perfect insect appears in December, January and February, and frequents rocky crags on mountains, at elevations of from 4,700 to 5,700 feet above the sea-level. It delights to rest on blackened rocks in the hottest sunshine, but dashes away with the greatest rapidity on the approach of the collector, so that it is generally rather difficult to capture.

DASYURIS OCTANS.

(*Dasyuris octans*, Huds., Ent. Mo. Mag. lix., 179.)

(Plate LI., fig. 15 ♂.)

This species was discovered by Mr. S. Lindsay on the Hunter Mountains, near Lake Manapouri, at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is slightly under 1 inch. All the wings are extremely pale orange-ochreous with black markings. The forewings have the apex rather rounded and the termen somewhat bowed outwards; there is a small white basal patch speckled with black; beyond this are two dentate transverse lines abruptly bent below costa; between this and the median band there is a broad transverse band of the ground

colour; the median band is narrow with marked constrictions below costa and above dorsum, these constrictions being deepest on the outer edge of the band; the black lines forming the median band are very indefinite strongly dentate, the centre of the band is heavily sprinkled with white scales; the terminal area is broadly suffused with black, broadest towards apex; there are many white scales interspersed with the black and traces of a wavy whitish subterminal line; a terminal series of black marks. All the cilia are cream coloured barred with black. The hind-wings have an oblique blackish basal patch speckled with white; two wavy blackish transverse bands on the median area; a very broad black terminal band, partially traversed by a fine wavy subterminal line. The body is black thickly speckled with white scales.

This species rather closely resembles the small grey variety of *Dasyuris hectori*, but may be distinguished by its smaller size, much narrower and more strongly dentate median band and faint orange-ochreous tinge.

The perfect insect appears in December.

DASYURIS ANCEPS.

(*Pidonia anceps*, Butl., Proc. Zool. Soc. Lond. 1877, 392, pl. xliii., 3; *Statira anceps*, Meyr., Trans. N.Z. Inst. xvi., 91; *Stathmonyma anceps*, ib. xviii., 184.)

(Plate XV., fig. 25 ♀.)

This species has been taken in the South Island on the Dun Mountain Nelson, Mount Arthur, Mount Peel, Castle Hill, Arthur's Pass, the Takitimu Mountains, and the mountains at the head of Lake Wakatipu, at elevations between 4,000 and 5,000 feet above the sea-level.

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are bluish-grey; there are four wavy blackish-grey transverse lines, the three lines nearest the base are double, and the line nearest the termen is shaded towards the base. The hindwings are pale yellow; there is a small dusky area, near the base, then a slightly curved blackish line, followed by two curved blackish lines close together; there is a series of irregular subterminal blotches and a black terminal band broadest at the apex. The cilia of all the wings are bluish-grey, barred with dusky black.

A smaller and more vividly-coloured form of this species is found on the "Mineral Belt" on the Dun Mountain, near Nelson.

The perfect insect appears in December, January and February, and frequents bare rocky situations on the mountains where it is sometimes very abundant. The bluish-grey colouring of the forewings affords this species a most efficient protection from enemies, whilst resting on the rocky ground which it always frequents.

DASYURIS ENYSII.

(*Pidonia enysii*, Butl., Proc. Zool. Soc. Lond. 1877, 391, pl. xliii., 9; *Statira homomorpha*, Meyr., Trans. N.Z. Inst. xvi., 91; *Statira enysii*, ib. xvii., 65; *Stathmonyma enysii*, ib. xviii., 184.)

(Plate XV., fig. 46 ♂.)

This species has occurred in the South Island at Mount Hutt.

The expansion of the wings is about 1 inch. The fore-wings are dark brown with the basal patch and median band edged with slightly waved darker brown and fine whitish lines; there is a darker terminal shading, and a fine indistinct wavy whitish subterminal line. The hind-wings are bright orange densely speckled with blackish from the base to one-third; there is an almost straight oblique black line at one-third, a very slender much broken median line, a wavy broken subterminal line, and a narrow black terminal band.

The perfect insect appears in January. It is very probably often mistaken during flight for *Notoreas brephos*, from which it may easily be distinguished by its larger size, browner colouring of fore-wings and simple antennae of the male.

Described and figured from a specimen in the Fereday collection.

DASYURIS PARTHENIATA.

(*Dasyuris partheniata*, Guen., Ent. Mo. Mag. v., 93; Meyr., Trans. N.Z. Inst. xvi., 92.)

(Plate XV., fig. 47 ♂.)

This very bright-looking species has occurred at Waiouru, on the Tararua Ranges and at Wellington in the North Island, and at Mount Arthur, Mount Hutt, Arthur's Pass, Mount Cook, Dunedin, Lake Wakatipu, and The Hump in the South Island.

The expansion of the wings is about 1½ inches. The fore-wings are bright orange-yellow; the base is speckled with black and dull green scales; there are one or two ill-defined blackish transverse lines at about one-third; a broad wavy dark brown band a little beyond the middle, with a projection towards the termen, followed by a clear space and another broad irregular dark transverse band; the termen is broadly bordered with dark brown, which is often almost continuous with the last-named transverse band. The hind-wings are bright orange; there is a large speckled area near the base edged with a curved black line, followed by a clear space, and an interrupted dark brown transverse line considerably beyond the middle; the termen is rather narrowly edged with a dark brown line, wavy towards the base of the wing. The cilia of all the wings are yellow barred with black.

The species varies considerably in the extent of the dark markings, especially on the fore-wings.

The egg is about one-fortieth of an inch in length, elliptical, yellowish-white with the surface covered with minute hexagonal depressions.

The young larva is extremely slender with the prolegs close together; the head and first segment are pale ochreous; the rest of the body is greenish-grey with two broad brownish dorsal stripes and numerous black bristles. It is very active. The foodplant is unknown.

The perfect insect appears from October till March, and frequents open, grassy situations. At Wellington, it may be taken on the cliffs close to the shores of Cook's Strait, flying very rapidly on hot, sunny days, which renders its capture very difficult in such steep situations.

This insect is found from the sea-level up to altitudes of about 4,500 feet and, over restricted areas, is sometimes very common.

DASYURIS FULMINEA.

(*Dasyuris fulminea*, Philp., Trans. N.Z. Inst. xlvii., 195.)

(Plate XV., fig. 44 ♂.)

A single damaged male specimen of this very distinct species was captured by Mr. W. G. Howes on Bold Peak, at the head of Lake Wakatipu.

The expansion of the wings is 1 inch. All the wings are deep brownish-black very slightly tinged with dull reddish with the lines dull cream colour, slightly reddish-tinged; the basal line is curved, slightly angulated; the first line is broad on the costa almost straight with an extremely acute angulation below the middle; the second line is broad slightly curved without distinct indentations. The hind-wings have a rather broad dull cream coloured median line.

The perfect insect appears in February.

The antennae of the type-specimen in the Dominion Museum have been restored in the figure given in this work. Until a perfect male specimen is available, it cannot be determined whether the species is correctly referred to *Dasyuris*.

DASYURIS PLUVIATA, n. sp.

(Plate XV., fig. 31 ♂.)

This species was discovered by Stella Hudson on Field Peak, Tararua Range, at an elevation of about 4,500 feet above the sea-level.

The expansion of the wings of the male is 1 inch. The fore-wings are smoky-black with very fine curved whitish markings; a very obscure basal line; the first line is gently outwards-curved, running from about ¼ of the costa to ¼ of dorsum; a faint outwards-curved median line, extending above and below the discal mark; second line slightly bent inwards below costa at two-thirds, strongly bowed outwards to before disc, thence running almost straight to dorsum at three-quarters; there is a faint indication of a subterminal line on costa at about ¾ and a few scattered yellow scales on some of the principal veins. The hind-wings are pale smoky-grey; a continuous fine whitish line below middle, meeting dorsum slightly above tornus, and a series of fine whitish subterminal marks; all the cilia are smoky-grey, barred with whitish on hind-wings only. The head and thorax are clothed with long black and yellow hairs; the abdomen is black, with segmental divisions marked in white. On the underside the fore-wings are pale grey, with the costal and apical areas broadly bordered with yellow; discal patch white with two diffused black dots; second line broad, white, bordered with blackish towards base; a subterminal series of confluent white spots. The underside of the hind-wings is almost entirely yellow; discal area white; a broad white transverse line below middle, irregularly edged with blackish towards base; a rather irregular broad white subterminal line; the veins on the undersurface are marked in yellow.

This species somewhat resembles *D. fulminea*, but lacks the very distinct angulated median line characteristic of that species. The lines on the upper surface of *D. pluviana* are also much slenderer than in *D. fulminea*, and there are other differences.

The perfect insect appears at the end of November. It was quite abundant amongst the tussocks, during a brief interval of sunshine which fortunately occurred. The

Tararua Range is rarely clear of clouds, or rain, during the early summer, and opportunities for the observation of this insect must be few and far between.

DASYURIS STRATEGICA.

(*Pasithea strategica*, Meyr., Trans. N.Z. Inst. xvi., 87; *Notoreas strategica*, ib. xviii., 184.)

(Plate XV., fig. 49 ♀.)

This conspicuous species was discovered by Mr. W. T. L. Travers, at Lake Guyon, in the South Island.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are dull yellowish-grey, becoming blackish along the edges of the transverse lines which are cream-coloured; there are two narrow bands near the base, the first outwardly oblique towards the dorsum, the second slightly curved; a dull orange shading in the centre of the median band, followed by a broad cream-coloured band very strongly angulated above the middle; there is a very wavy subterminal line. The hind-wings are dull yellowish-grey near the base, becoming blackish towards the termen; there is a small cream-coloured area near the base, then two rather broad, slightly irregular cream-coloured bands, and a rather fine wavy white subterminal line. The cilia of all the wings are white, barred with blackish-brown.

The perfect insect appears in January.

Described and figured from the type specimen in the Fereday collection.

DASYURIS CALLICRENA.

(*Pasithea callicrena*, Meyr., Trans. N.Z. Inst. xvi., 87; *Notoreas callicrena*, ib. xviii., 184.)

(Plate XV., fig. 22 ♂.)

This very handsome species has occurred in the South Island at Arthur's Pass, Mount Cook, the Hunter Mountains, and the mountains around the head of Lake Wakatipu.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female $1\frac{1}{4}$ inches. The forewings of the male are deep brownish-black, sometimes slightly tinged with orange-brown; there are four conspicuous cream-coloured transverse bands; the first near the base slightly curved; the second at about $\frac{1}{3}$ slightly waved; the third at $\frac{2}{3}$ broad with a distinct projection above the middle; the fourth, subterminal, very fine broken and wavy. The hind-wings are greyish-black with a faint basal line, a broad cream-coloured median band and a fine wavy subterminal line. The cilia of all the wings are cream-coloured barred with brownish-black. In the female all the wings are faintly clouded with yellowish-orange and there is an additional band between the second and third lines on the fore-wings, traces of this band also occurring in some male specimens.

The perfect insect appears in December and January, and flies with great rapidity in the hottest sunshine. It frequents open grassy slopes on mountains, between 3,000 and 4,000 feet above the sea-level, and in such places it is often locally abundant.

Mr. Prout considers that this species should be transferred to the genus *Dasyternica*.

DASYURIS TRANSAUREA.

(*Dasyuris transaurea*, Howes, Trans. N.Z. Inst. xlv., 203.)

(Plate XV., fig. 40 ♂.)

This handsome and conspicuous species was discovered by Mr. Howes on the Garvie Mountains, near Nevis, Central Otago. It has also occurred on Flagstaff Hill, near Dunedin, at Waipori, and on the Humboldt Mountains, Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. All the wings are bright orange-yellow broadly striped and bordered with blackish-brown; there is an extensive blackish-brown patch around the body; two broad bars of blackish-brown on the costa and two broad bars on the dorsum of the fore-wings; the same markings are repeated on the hind-wings, but the discal areas of both wings are brilliant orange-yellow; all the blackish markings are more or less distinctly bordered with white, the white markings being continuous across the wings as faint unbroken transverse lines; there are several white dots on the terminal band of the fore-wings; one white spot on the terminal band of the hind-wings and a subterminal row of yellow dots on both wings. The cilia are pale yellow barred with blackish.

The perfect insect appears from November till January.

Described and figured from a specimen kindly lent to me by Mr. Howes.

DASYURIS LEUCOBATHRA.

(*Dasyuris leucobathra*, Meyr., Trans. N.Z. Inst. xliii., 59.)

(Plate XV., fig. 45 ♀.)

This interesting little species has occurred at Arthur's Pass, on the Otira River bed, Bold Peak, Lake Wakatipu, and the Hunter Mountains.

The expansion of the wings is from barely $\frac{3}{4}$ inch to about 1 inch. All the wings are greyish-black. The fore-wings have five sharply defined white transverse lines, the fourth line being bowed towards the termen near the middle. The hind-wings have three transverse lines, the subterminal being broken and somewhat irregular. In fresh specimens the veins are strongly marked in yellow. The cilia are white narrowly barred with blackish.

Apparently very variable in size. Apart from the simple antennae of the male, this species might readily be mistaken for *Notoreas mechanitis*, or some of its allies.

The perfect insect appears in December and January, and frequents open sunny situations at altitudes of from 1,500 to 4,000 feet above the sea-level.

Genus 17.—LYTHRIA, Hübn.

Face and palpi roughly hairy. Antennae in ♂ bipectinated. Thorax and femora rough-haired beneath. Fore-wings: areole simple. Hind-wings normal.

(Plate C., figs. 39, 40 neuration of *Lythria chrysopeda*.)

We have four species in New Zealand, and three other species occur in Europe.

LYTHRIA PERORNATA.

(*Eidonia perornata*, Walk., Cat. xxvi., 1672; *Pasitheia perornata*, Meyr., Trans. N.Z. Inst. xvi., 87; *Notoreas perornata*, ib., xviii., 184.)

(Plate XV., figs. 41-43 ♀, varieties; Plate II., figs. 32, 33 larvae.)

This very pretty little insect has occurred at Whakapapa (Ruapehu), Waimarino, Waiouru, Palmerston North and Wellington in the North Island. It is generally distributed throughout the South Island.

The expansion of the wings is from $\frac{3}{4}$ to fully 1 inch. The fore-wings are dark brownish-black, with five transverse white or orange-yellow lines, which vary considerably both in width and colour in different specimens; the two basal lines are almost straight, the rest are wavy, the last but one has, near the middle, a strong projection towards the termen. The hind-wings are bright orange, with three or four more or less broken black transverse lines. The termen is narrowly bordered with black; the cilia of all the wings are white, more or less distinctly barred with blackish-brown.

There is considerable local and general variation. The form from Mount Ruapehu (Whakapapa) is very large; the ground colour almost black, with narrow orange-brown bands on the fore-wings, and broader orange-brown bands on the hind-wings, the whole insect having a very dark appearance. A very similar, but somewhat smaller and paler form (fig. 42), occurs at Waiouru. Specimens from Wellington (fig. 41), are usually small, with the transverse lines on the fore-wings mostly white; those from Mount Arthur and Arthur's Pass usually have the transverse lines on the fore-wings broader and mostly white. Specimens from the Kaikouras have the transverse bands of fore-wings very broad and entirely pale yellow. The mountain form from Lake Wakatipu (fig. 43), closely resembles the Wellington form, but is larger and has the white bands on the fore-wings wider and more suffused with yellow. Intermediate forms between all these local varieties are frequently met with.

The larva, which was discovered by Mr. R. M. Sunley, is slightly over $\frac{1}{2}$ inch in length, stout, and uniform in thickness, except near the head and tail where it tapers very rapidly. One variety is rather pale green, more or less speckled with white, with the head and anterior portion of the second segment yellowish-brown and the segmental divisions wrinkled and marked in yellow; there is a conspicuous broken white lateral line with black marks at the segmental divisions, and the posterior extremity is dull yellow. The other variety is orange-brown with a broad pale orange dorsal stripe, several fine wavy white lines, and a series of dark marks between the segments. This larva is very sluggish in its habits. It feeds on *Pimelea prostrata*, a dwarf shrubby plant which grows commonly on cliffs near the sea coast, sometimes reaching to considerable elevations.

The perfect insect appears from November till April, flying actively in the hot afternoon sunshine. It is sometimes locally abundant, and is often found on mountains as high as from 3,000 to 4,000 feet above the sea-level.

LYTHRIA CATAPYRRHA.

(*Eidonia catapyrrha*, Butl., Proc. Zool. Soc. Lond., 1877, 392, pl. xliii., 2; *Stratonice catapyrrha*, Meyr., Trans. N.Z. Inst. xvi., 64; *Stratonice eucidiata*, ib. xvii., 63; *Arctesthes eucidiata*, ib. xviii., 184; *Arctesthes eucidiata*, ib. xx., 47; *Lythria eucidiata*, Huds., N.Z. Moths, 68.)

(Plate XV., fig. 6 ♂.)

This pretty little species has occurred in the South Island at Lake Rototoi, near Nelson, Kaikoura Mountains, Lake Guyon, Lake Tekapo, Otira Gorge, Wedderburn, Central Otago, Dunedin, Lake Wakatipu, and Mount Linton, near Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are dark greyish-brown with black and white markings; there is a curved black transverse line near the base, followed by a white line, then two black lines close together followed by another white line, then a broad black line followed by a pale median band containing a well-marked discal dot, beyond this there are two angulated black lines, and a very conspicuous white line; there is a broad black shading on the termen, traversed by a rather obscure fine whitish subterminal line. The hind-wings are rather narrow, yellowish-orange, speckled with black near the base, there is a strongly angulated black line near the middle, and blackish band near the termen. On the under side the fore-wings are yellow, with two black transverse bands from the costa near the termen and a red mark near the apex; the hind-wings are streaked with white and yellow, and broadly bordered with red on the costa and termen; there are several broad black transverse bands. The female is usually paler than the male.

This species is extremely variable in the extent of the white markings and general depth of the colouring of the fore-wings; also in the width of the dark transverse bands on the hind-wings. The red border on the costa and termen of the underside of the hind-wings is, however, a good character.

A local variety of this insect occurs in the Kaikoura Mountains, having the upper side of the hind-wings bright orange. Another mountain form has the median band wholly black.

The perfect insect appears from October till March, and frequents dry, open, sunny places, usually at elevations of from 1,000 to 2,000 feet above the sea-level. It is very abundant in the Dart Valley, at the head of Lake Wakatipu. Generally speaking, however, it is a local species, and only found in restricted areas. There are evidently at least two broods in the season.

LYTHRIA SIRIS.

(*Lythria siris*, Huds., Trans. N.Z. Inst. xl., 106, pl. xv., 1.)

(Plate XV., fig. 4 ♂, 5 ♀.)

This very neatly-marked little species was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago, at an elevation of about 4,000 feet.

The expansion of the wings is a little over $\frac{1}{2}$ inch. The fore-wings are slaty-grey, with light reddish-brown, black, and pale-yellowish markings; there is a very small grey basal patch, followed by a wavy transverse reddish-brown band; next two yellowish-white bands enclosing a very narrow yellowish-brown sub-basal area; then a strongly waved whitish line, followed by

a narrow black line and a broad reddish-brown line; the median band is broad, slaty-grey, with a reddish-brown discal dot; its outer edge is bounded by an extremely sharply angulated series of lines, consisting of a narrow reddish-brown line, a narrow black line, a narrow yellowish-white line, and a cloudy orange-brown line; the terminal area is dark-brown with a very fine, wavy, whitish subterminal line and a series of small reddish-brown spots. The hind-wings are golden-yellow, with the basal and terminal portions broadly clouded with black; there is a very wavy central black line. The cilia of all the wings are brownish-grey. The female is paler, and much less distinctly marked than the male.

The perfect insect appears in February.

LYTHRIA CHRYSOPEDA.

(*Arcteuthis chrysopeda*, Meyr., Trans. N.Z. Inst. xx., 48.)

(Plate XV., fig. 2 ♂, 3 ♀.)

This bright-looking little species has been taken in the South Island at Mount Arthur.

The expansion of the wings is about $\frac{3}{4}$ inch. *The fore-wings are very dark, glossy brown with orange-yellow markings; there is a curved transverse line near the base, a broader, rather wavy line a little before the middle, another still broader and sharply angulated at about two-thirds, and a broken subterminal line. The hind-wings are rich brown, with three broad, wavy, orange-yellow transverse bands. The female is generally rather paler than the male with the orange-yellow markings broader, very faintly marked specimens occasionally occurring.*

The perfect insect appears in January and February. It frequents the tussock openings in the forest on the Tableland of Mount Arthur, at elevations of from 3,000 to 4,000 feet. In these situations it appears to be fairly abundant, flying actively in the hottest sunshine.

Sub-family 2.—STERRHIDES.

Fore-wings: 10 rising out of 9, 11 anastomosing or connected with 9. Hind-wings: 5 fully developed, rising from middle of transverse vein, parallel to 4, 8 very shortly anastomosing with upper margin of cell near base, thence rapidly diverging.

(Plate C., figs. 49, 50; neuration of *Leptomeres rubraria*.)

A very considerable family, well represented in all regions except New Zealand, where the single species is an immigrant from Australia.

Genus 1.—LEPTOMERIS, Hübner.

Antennae in ♂ fasciculate-ciliated. Posterior tibiae in ♂ dilated, without spurs, in ♀ with all spurs present.

A large genus of almost universal distribution.

LEPTOMERIS RUBRARIA.

(*Ptychopoda* (?) *rubraria*, Dbld., Dieff. N.Z. ii., 286; *Fidonia* (?) *acidatharia*, Walk., Cat. xxiv., 1037; *replectaria*, ib. Cat., xxiii., 778; *attributa*, ib. 779; *Acidalia figlinaria*, Gn. Lep. ix., 454, pl. xii., 8; *Acidalia rubraria*, Meyr., Trans. N.Z. Inst. xvi., 57 Meyr., Proc. Linn. Soc. N.S.W. 1887, 852.)

(Plate XV., fig. 8 ♂; Frontispiece, fig. 23 egg; Plate II., fig. 23 larva.)

Except in the extreme south this pretty little insect is very common, and generally distributed throughout the country. It is also found in the Chatham Islands.

The expansion of the wings is about $\frac{3}{4}$ inch. *The fore-wings are reddish-ochreous with three oblique, wavy, dull brown transverse lines, the first at about one-fourth, the second slightly broader at about one-half, the third much broader, and sometimes partially divided near the costa; there is a black discal dot, a subterminal series of rather large dull brown spots, and a terminal series of minute black dots. The hind-wings are pinkish-ochreous; there is a dull brown wavy transverse band near the base, two close together a little beyond one-half, a series of subterminal spots, and a very distinct series of minute black terminal dots. The cilia of all the wings are dull brown, mixed with reddish-ochreous.*

There is often considerable variation in the intensity of the colouring of this insect, some specimens being much darker than others, but the markings are very constant, and the species is thus always easily recognisable.

The egg, which is about one-fortieth of an inch in length, is pale ochreous, elongate, with one end very slightly pointed the other truncate; it is traversed by numerous longitudinal ridges and impressed with minute hexagonal depressions.

The larva when first excluded from the egg is about $\frac{1}{2}$ inch in length; extremely attenuated, dull green, with a broad white lateral stripe and the head and anterior segments brownish.

The full-grown larva is about $\frac{3}{4}$ inch in length, very slender, cylindrical, and of almost uniform thickness; segments 2, 3 and 4 are very short, also segments 10, 11, 12 and 13, the other segments being very long. Its general colour is dull ochreous, with a broad dark brown lateral line, and a much finer and more obscure dorsal line; the whole surface of the larva is very finely and regularly wrinkled; the spiracles are black and very conspicuous; in some specimens the under parts are more or less clouded with brownish-grey, and the whole larva considerably darker.

The foodplant is *Plantago* and other low plants. This larva feeds during the late autumn and early winter. It is very sluggish, but when disturbed curls itself into an irregular coil with extraordinary rapidity.

The pupa is concealed amongst refuse on the surface of the ground.

The perfect insect appears from January till April. In the late summer and autumn it frequents dried-up, weedy pastures, where it is often extremely abundant. Straggling specimens may also be taken in the early spring.

According to Mr. Meyrick, this species occurs very commonly in New South Wales, Victoria and Tasmania, Australian and New Zealand specimens being identical in appearance. It is also found in the Kermadec Islands.

Sub-family 3.—MONOCTENIADES.

Hind-wings: 5 fully developed, parallel to 4, 8 approximated to upper margin of cell to middle or beyond, sometimes with connection near base.

(Plate C., figs. 44-48 and 54 and 55.)

A family of moderate extent and early type, better represented in Australia than elsewhere. The first four

genera are of Australian type, the fifth American and European.

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|--------------|------------------|
| 1. SAMANA. | 4. DICHROMODES. |
| 2. THEOXENA. | 5. EPIRRHANTHIS. |
| 3. ADEIXIS. | |

Genus 1.—SAMANA, Walk.

Face with cone of scales. Palpi very long, rough-scaled. Antennae in ♂ shortly ciliated. Fore-wings: 10 anastomosing with 9, 11 anastomosing with 10. Hind-wings 6 or 7 connate or stalked, 8 approximated to beyond middle of cell.

An endemic genus containing two species.

SAMANA FALCATELLA.

(*Samana falcateLLa*, Walk., Cat. xxvii., 197; *Panagra falcateLLa*, Meyr., Trans. N.Z. Inst. xvi., 93; *Samana falcateLLa*, Meyr., Trans. N.Z. Inst. xvii., 65.)

(Plate XLVIII., fig. 25 ♂.)

This very rare species has occurred in the North Island on the Poor Knights' Islands, near Whangarei, on the Waitakerei Ranges, at Taihape and, in the South Island, at Nelson, Dunedin and Queenstown Lake Wakatipu.

The expansion of the wings is 1½ inches. The fore-wings are very pale ochreous, speckled with grey; there is a very fine longitudinal black streak from a little beyond the base to considerably before the middle, slightly clouded above; an elongate discal dot; a very oblique slightly curved black streak from near the apex to the middle of the dorsum, edged with white towards the base, and clouded with brown towards the termen; the apex of the wing is very acute. The hind-wings are white, with a black discal dot.

The perfect insect appears in February, and apparently frequents manuka scrub (*Leptospermum*).

SAMANA ACUTATA.

(*Samana acutata*, Butl., Proc. Zool. Soc. Lond., 1877, 401; Meyr., Trans. N.Z. Inst. xvii., 67.)

(Plate XV., fig. 39 ♀.)

This very interesting species was rediscovered by Mr. J. W. Campbell at New Brighton, near Christchurch, who states that it is by no means rare in that locality at the proper season.

The expansion of the wings is about 1½ inches. It very closely resembles *Samana falcateLLa* from which it differs in the slightly shorter and straighter black basal streak; also in the oblique transverse streak which has a very acute angulation inwards at about one-third of its length before it reaches the dorsum.

The perfect insect appears in September and October, occurring amongst gorse and manuka (*Leptospermum*), etc. It is also attracted by light.

Described and figured from a specimen kindly lent to me by Mr. C. E. Clarke.

Genus 2.—THEOXENA, Meyr.

Face smooth. Palpi moderate, rough-scaled. Antennae in ♂ fasciculate-ciliated. Fore-wings: 10 anastomosing with 9, 11 anastomosing with 10, sometimes also very shortly with 12. Hind-wings: 6 and 7 connate or stalked, 8 approximated to beyond middle of cell.

An endemic genus containing a single species apparently of great rarity.

THEOXENA SCISSARIA.

(*Panagra scissaria*, Gn., Ent. Mo. Mag. v., 43; *Theoxena scissaria*, Meyr., Trans. N.Z. Inst. xvi., 56.)

(Plate XV., fig. 38 ♂.)

Many years ago this very delicate species occurred at Christchurch. It has also been found at Mount Grey, Ashley Gorge and Ida Valley, Central Otago.

The expansion of the wings is 1 inch. All the wings are white. The fore-wings have a longitudinal, slightly curved black line, extending from a little beyond the base, almost as far as the termen below the apex; above this line there is a black dot at about one-third; the apex of the fore-wing is slightly hooked, and there is a row of minute black dots on the termen of both fore- and hind-wings. In the female the characteristic longitudinal black line is absent.

The perfect insect appeared in January. According to Fereday it frequented the plains near Christchurch, and towards the foot of Mount Hutt. Mr. J. H. Lewis, who first re-discovered the species at Ida Valley, stated that it appeared in the late winter, his first specimen having been taken at light, whilst the snow was lying on the ground. In that locality none were seen after August.* Quite recently Mr. S. Lindsay has taken the insect at Mount Grey and Ashley Gorge in December.

Described and figured from a specimen in the Fereday collection.

Genus 3.—ADEIXIS, Warr.

Face obliquely prominent, with small cone of scales. Palpi moderately long, rough-scaled. Antennae in ♂ bipectinated. Fore-wings: 10 anastomosing with 9 above 7. Hind-wings: 6 and 7 approximated, 8 approximated to beyond middle of cell. (Plate C., figs. 54, 55 neurulation of *Adeixis griseata*.)

Represented by one species only.

ADEIXIS GRISEATA.

(*Dichromodes griseata*, Huds., Trans. N.Z. Inst. xxxv., 244.)

(Plate XV., fig. 37 ♂.)

This species has occurred at Waimarino, Raetihi, Ohakune and Kaitoke in the North Island, and at Seaward Moss and other coastal swamps near Invercargill in the South Island. It is also found on the Chatham Islands.

The expansion of the wings is about ¾ inch. The fore-wings are silvery-grey; there is a black discal dot; an irregular blackish elongate-triangular patch reaching from the basal half of the dorsum almost to the apex of the wing; a much smaller, somewhat triangular, marking beyond this, followed by a dark terminal shading. The hind-wings are greyish-ochreous, darker on the base and termen.

*Trans. N.Z. Inst. xxxiii., 186.

This species is extremely variable in the depth of colouring and intensity of the markings.

The perfect insect appears from January to March, and is found in swampy places. It is very uncertain in its appearance, although sometimes fairly common over restricted areas. When at rest the wings are held so as to meet below the body, and a position is generally chosen with the head pointing downwards.

Genus 4.—DICHROMODES, Guen.

Face with cone of scales. Palpi moderate to very long, rough-scaled. Antennae in ♂ unipectinated. Fore-wings: 10 usually anastomosing with 9, but sometimes separate. Hind-wings: 6 and 7 approximated, 8 approximated to beyond middle of cell.

(Plate C., figs. 44, 45 neuration of *Dichromodes sphaeriata*.)

A characteristic Australian genus of considerable extent, which has established a small colony of six species in New Zealand, forming a homogeneous endemic group. Most of the New Zealand species of *Dichromodes* appear to be scarce; they are very inconspicuous and probably escape notice.

DICHROMODES IDA.

(*Dichromodes ida*, Huds., Trans. N.Z. Inst. xxxvii., 356, pl. xxii., 2.)

(Plate XV., fig. 17 ♂.)

This interesting species was discovered by Mr. J. H. Lewis at Ida Valley, Central Otago.

The expansion of the wings is $\frac{3}{4}$ inch. *The fore-wings are very pale greenish-blue, speckled and marked with black; there is an ill-defined wavy black stripe near the base; another at about $\frac{1}{3}$, followed by an almost clear space containing a conspicuous black discal spot above the middle; the outer edge of the median band is bordered by a very jagged black line, and is followed by a very conspicuous pale-ochreous line; beyond this are two very ill-defined black bands. The cilia are black, mixed with pale bluish-green. The hind-wings are pale ochreous yellow, speckled with black, especially towards the base and termen; there is a conspicuous black discal spot, and a clear yellowish subterminal band. The cilia are blackish. The head and thorax are black dotted with pale bluish-green; the abdomen yellowish.*

Mr. Lewis favoured me with the following note relating to the transformations of this insect:—"The specimen was bred from a pupa found in a cleft of rock: a chamber had been formed by cementing moss-dust and silk together. From the fragments of caterpillar-skin remaining, I judge that the larva was one I had tried unsuccessfully to rear a few weeks ago, found feeding openly on lichen, remarkable for its fimbriated aspect, each segment being produced into irregular lobed processes at the edges—very protective amongst lichen."

The perfect insect appears in November, and frequents open rocky country.

DICHROMODES SIMULANS.

(*Dichromodes simulans*, Huds., Trans. N.Z. Inst. xl., 107.)

(Plate XV., fig. 14 ♂.)

This species was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago, at an elevation of

about 4,000 feet. It has also occurred at Alexandra South.

The expansion of the wings is about $\frac{3}{4}$ inch. *The fore-wings are dull bluish-grey, with two diffused yellowish-brown bands, and the veins clouded with yellowish-brown; there are two jagged blackish transverse lines enclosing a darker median band which contains a black discal dot; a cloudy subterminal line and a series of bluish-grey marks on the termen. The hind-wings are yellowish-brown, clouded with dull-brown towards the base and termen, leaving the central portion paler. The cilia of all the wings is yellowish-brown mixed with black.*

This species has a deceptive resemblance to *Notoreas fulva*, from which it differs in the following respects: The wings are somewhat broader, the transverse lines more indented, the cilia not strongly barred, and the antennae of the male unipectinated.

The perfect insect appears in February, and frequents rocky places.

DICHROMODES SPHAERIATA.

(*Cidaria sphaeriata*, Feld., Reis. Nov. pl. cxxxii., 14; *Dichromodes petrina*, Meyr., Trans. N.Z. Inst. xxiv., 216.)

(Plate XV., fig. 12 ♂.)

This rather dull-looking little insect has occurred at Paekakariki and Wellington in the North Island, and at Kekerangu, Tapawera, near Nelson, and Queenstown in the South Island.

The expansion of the wings is from $\frac{1}{2}$ to $\frac{3}{4}$ inch. *The fore-wings are dull greenish-grey; there is a black, jagged, somewhat broken, transverse line at about one-third, and another at about two-thirds, enclosing a slightly darker median band, sometimes containing a black discal dot; there is also a darker shading on the termen, and an obscure wavy paler subterminal line. The hind-wings are grey, with a faint wavy median line.*

The perfect insect appears from November till March. It frequents dry, open, sunny situations, generally alighting on paths or roads. It is also attracted by light.

DICHROMODES CYNICA.

(*Dichromodes cynica*, Meyr., Trans. N.Z. Inst. xliii., 60.)

(Plate XV., fig. 11 ♂.)

This very dark-looking little species was discovered on the Lyttelton Hills, near Christchurch. It has also occurred on Mount Grey, North Canterbury.

The expansion of the wings is $\frac{1}{2}$ inch. *The fore-wings are leaden-grey, finely sprinkled with black; the veins are obscurely marked with dull yellowish; there are three broad wavy broken black transverse lines, the first at $\frac{1}{3}$, the second at $\frac{2}{3}$, and the third, which is somewhat diffused, subterminal. The hind-wings are blackish-brown slightly tinged with purple. The cilia of all the wings are dark grey.*

The perfect insect appears in November, and flies actively over stony places in hot sunshine. It is apparently a very rare and local species.

DICHROMODES NIGRA.

(*Cacopsodos niger*, Butl., Proc. Zool. Soc., Lond. 1877, 395, pl. xliii., 4; *Dichromodes nigra*, Meyr., Trans. N.Z. Inst. xx. 60.)

(Plate XV., fig. 13 ♂, 36 ♀.)

This very dark-looking species has occurred on Mount Ruapehu in the North Island and on the Dun Mountain

and Mount Arthur, near Nelson, at Otira, and on the lower slopes of Mount Earnslaw, at the head of Lake Wakatipu, in the South Island.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dull black, finely speckled with white; there is a distinct discal dot; three very jagged black transverse lines, one at the base, one at $\frac{1}{2}$ and one at $\frac{3}{4}$, followed by a broad broken subterminal shading and a terminal series of elongate black dots. The hind-wings are greyish-black, sometimes strongly tinged with orange-yellow in the female, with one or two dusky bands.

A variety of this insect, rather smaller than usual, occurs on the Dun Mountain track. In this form the markings are duller and less distinct than in the type, but its specific separation is not warranted.

The perfect insect appears in January and February. It is found in dry, stony places, usually in openings in beech forests, at elevations of from 1,500 to 3,000 feet above the sea-level. It flies rapidly in hot sunshine.

DICHROMODES GYPSOTIS.

(*Dichromodes gypsotis*, Meyr., Trans. N.Z. Inst. xx., 60; *Cacopodos niger*, ib. xvi., 94.)

(Plate XV., fig. 15 ♂.)

This very distinct species has occurred at Poolburn, Central Otago, and at Lake Wakatipu.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are pale greyish-cream colour, with black markings. The basal line is broad and very dark; the first line is wavy, of uneven width, with a conspicuous triangular projection below the middle; the second line irregular, with a strong projection in the middle; there is a very broad cloudy subterminal band, darkest on the costa, and an indistinct pale subterminal line beyond this. The hind-wings and cilia are blackish.

The larva, which feeds on lichens, evidently closely resembles that of *Dichromodes ida*.*

The perfect insect appears in December and January, but is very rarely met with.

Described and figured from a specimen in the Dominion Museum.

Genus 5.—EPIRRHANTHIS, Hübn.

Face with tolerably appressed scales. Palpi rather short. Antennae in ♂ slightly ciliated. Fore-wings: 10 anastomosing with 9, 11 anastomosing with 12 and then with 10. Hind-wings: 6 and 7 approximated, 8 approximated to cell to about middle, with rudimentary or incomplete connection near base.

(Plate C., figs. 46, 47 neuration of *Epirrhantthis alectoraria*; fig. 48 head of ditto.)

The typical species is European. The South American genus *Phellinodes* is allied to this.

Represented in New Zealand by three species.

EPIRRHANTHIS HEMIPTERARIA.

(*Hemierophila hemipteraria*, Guen., Lep. ix., 220, pl. vi., 2; *Xyridaema hemipteraria*, Meyr., Trans. N.Z. Inst. xx., 60.)

(Plate XV., fig. 26 ♂, 27 ♀, 28 ♂ variety.)

This remarkable-looking species seems to be generally distributed throughout the country.

*Trans. N.Z. Inst. xlix., 211.

The expansion of the wings is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. All the wings are pale ochreous-brown, with a variable number of minute black dots; there are four or five oblique, wavy brown transverse lines on both fore- and hind-wings, the central and terminal lines being often slightly darker than the others; there is always a black dot in the middle of the fore-wing, and a shaded spot near the termen below the apex. The apex of the hind-wing is very pointed and projects downwards; the almost straight termen has a series of prominent projections.

This species varies in the intensity of the markings, and in the number of the black dots, but is always easily recognisable by the peculiar outline of its hind-wings and absence of pectinations in the antennae of the male. The beautiful variety shown on Plate XV., fig. 28 was captured by Mr. Morris N. Watt on Mount Egmont.

The egg is oval, considerably flattened, pale bluish-green covered with numerous very minute depressions.

The larva feeds on veronicas from September till May, and it is probable that there are at least two broods in a season.

Its length when full grown is about 1 inch. Some larvae are green, with a broad bluish dorsal line, and two fine yellow lateral lines. Others are brown, with a dull yellow dorsal line.

During the daytime these caterpillars firmly clasp the stem of their foodplant with their prolegs, and hold the rest of their body rigidly out from the branch. In this position they are very inconspicuous, and may readily be mistaken for young leaves or twigs. At night they become much more active, and may then be seen walking about and feeding.

The pupa is rather robust, with a sharp spine at its extremity. Its colour is pale olive-brown, with the wing-cases and sides of the abdomen pinkish. It is not enclosed in any cocoon, but is merely concealed amongst the dead leaves and rubbish around the stem of the veronica.

The perfect insect appears from November till March. It is often found in gardens and other cultivated places, probably on account of the number of veronicas that frequently grow in such situations. It is attracted by blossoms and by light, but is not a very common species. The colouring and wing-outline of this moth cause it to very closely resemble a dead leaf, especially when resting amongst foliage or on the ground. This insect may be occasionally noticed abroad on mild evenings in the middle of winter, and it thus appears probable that some individuals hibernate in the imago state, whilst others pass the winter as pupae.

EPIRRHANTHIS USTARIA.

(*Ennomos ustaria*, Walk., Cat. xxvi., 1519; *Amilapis* (?) *acrotaria*, Feld. Reis. Nov. pl. cxxiii., 6; *Lyrcia varians*, Butl., Cist. Ent. ii., 496; *Epirrhantthis alectoraria*, Huds., N.Z. Moths, pl. viii., 42, 43; *hudsoni*, Prout, Seitz, Macrolep., xii., 34; *unitinea*, ib.)

(Plate XVI., fig. 3 ♂, 4 ♀; Frontispiece fig. 16 egg; Plate II., figs. 9-11 ordinary larvae, fig. 18 variety.)

This beautiful and very variable species has occurred in tolerable abundance at many localities in both North

and South Islands. It is probably generally distributed throughout the country.

The expansion of the wings is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. The fore-wings have a strong angle, almost a tooth, in the middle of the termen and the hind-wings have the termen strongly dentate. All the wings are dull yellowish-brown or reddish-brown of very variable depth, sometimes irregularly clouded with darker brown; there are often large speckled yellow or blackish-grey patches on each wing below apex and on dorsum near middle. Other specimens have one or two small white spots on fore-wings below apex and on hind-wings beyond middle, whilst others are almost unicolorous. Most of the varieties closely resemble the varied hues of fading leaves. In many the greyish speckled marks imitate the irregular patches of mould which are often present on dead leaves.

The egg, which is deposited on its side is oval, much flattened above with the surface very slightly roughened. When first laid it is pale opal-green in colour, but becomes dull olive-green as the embryo develops.

The young larva is very pale green with the head brownish-yellow. At this early stage its colouring already completely harmonises with that of the underside of the leaves of its foodplants, *Pittosporum eugenoides* and *P. tenuifolium*. The full-grown larva is very robust, and about 1 inch in length. Its colour is pale green with numerous yellow dots and a series of diagonal yellow stripes on each segment; there is, in addition, a series of broad crimson blotches on the back and a small crimson flap projecting from the end of the terminal segment; the prolegs and spiracles are also crimson. Varieties of the larva sometimes occur which are more or less suffused with purple (fig. 18). The remarkable shape and colouring of this caterpillar, combined with the peculiar attitude assumed when at rest, affords it complete protection, causing it to resemble, in the closest possible manner one of the buds of its foodplant. These larvae are found during the whole of the spring and summer. They grow slowly, and occupy three or four months in attaining full size. They are very sluggish in their habits.

The pupa is greenish-brown in colour. It is enclosed in a cocoon constructed of two or three leaves of the foodplant, fastened together with silk. The insect remains in this condition for three weeks or a month.

The moth first appears about October, and is met with until the middle of April, occasional stragglers being found during the winter months. It frequents the edges of forest, or scrub, where its foodplants are often abundant.

EPIRRANTHIS ALECTORARIA.

(*Lyrceca alectoraria*, Walk., Cat. xx., 259; Meyr., Trans. N.Z. Inst. xvi. 95 (part); Huds. N.Z. Moths, pl. viii., 44-47; octomaculata, Th. Mieg, Miscel. Ent. xxii., 63.)

(Plate XVI., fig. 5 ♂, 6-8 ♀ varieties.)

This is another very beautiful and extremely variable species, found in both North and South Islands, and long regarded as identical with *E. ustaria*. It can, however, be distinguished by the following characters:—

The wings are longer with the margins irregular; the prevailing colour is usually ochreous-yellow or bright yellow, often speckled or mottled with grey. Some forms have large ringed spots situated on each wing below apex and on the dorsum near middle; others have plain blotches similarly situated, whilst others are almost unicolorous. There is a certain amount of resemblance between some of the varieties of this species and those of *E. ustaria*, but the peculiar wing-outline of each species, which is only subject to very slight variation, enables a long series of specimens to be readily separated into the two species. The larger and more striking forms seem to usually frequent forest-clad hills of considerable elevation. I am much indebted to Mr. Morris N. Watt for the opportunity of figuring the beautiful variety depicted on Plate XVI., fig. 8. The specimen was captured by him in the forest on the lower slopes of Mount Egmont, and similar forms occur on the lower slopes of Mount Ruapehu. Another very beautiful variety, in Mr. Clarke's collection, is figured on Plate XLVIII., fig. 33.

The egg closely resembles that of *E. ustaria*, but becomes marked with deep brown before hatching.

The young larva is about $\frac{1}{2}$ inch in length, cylindrical, rather stout, of uniform thickness, with the skin transversely wrinkled; deep orange-yellow with a very broad reddish-brown dorsal stripe; head clear deep yellow, also anal prolegs which are very large. The young larva is fairly active, and does not eat the egg-shell on emergence. The foodplant is *Nothopanax arboreum*. The full-grown larva is about $1\frac{1}{4}$ inches in length, cylindrical, rather stout, slightly thicker posteriorly, with the segmental divisions margined in yellow; the antennae are tipped with crimson; general colour uniform bright green, sometimes bluish-tinted; there are numerous fine transverse wrinkles; a broad bright yellow, or white, dorsal line; the spiracles are brown; the lateral and ventral regions are often very finely speckled with whitish; the prolegs are moderate in size and the anal flap acutely pointed. This larva is of sluggish habit, resting on the leaves of its foodplant and eating out large "bays" from their edges. Whilst thus engaged it is very inconspicuous.

The pupa is enclosed in a frail cocoon, composed of silk and refuse, on the surface of the ground. It is about $\frac{1}{2}$ inch long, dull brown, with wing-, head- and leg-cases greenish.

The perfect insect appears from November till March. It is a rarer and less generally distributed species than *E. ustaria* and seems to be more restricted to the North Island.

We are indebted to Mr. Prout for pointing out the distinctions between *Epirranthis ustaria* and *E. alectoraria*.*

Sub-family 4.—SELIDOSEMIDES.

Hind-wings with vein 5 imperfect (not tubular) or obsolete, 6 and 7 usually separate, 8 usually obsoletely connected with upper margin of cell near base, approximated to near middle.

(Plate C., fig. 51 to 53 and 56 to 64.)

A very large sub-family, in all regions but quite inadequately represented in New Zealand. It varies considerably

*Proc. N.Z. Inst. xlii., 53.

ably in superficial appearance, and is also remarkable for the variability of structure of veins 10 and 11 of the fore-wings in many (not all) species. Imago with body slender to rather stout; fore-wings broad to rather elongate, triangular; posterior tibiae of male often enlarged and enclosing an expansible tuft of hairs. The structure termed the fovea is a circular impression on the lower surface of the fore-wings above the dorsum near the base, usually placed about the origin of the basal fork of 1b; it is generally confined to the male, and is often sub-hyaline, sometimes surmounted by a small thickened gland; it may possibly be a scent-producing organ. It is strictly confined to that branch of which *Selidosema* is the type, but is not invariably present there.

Ovum subcylindrical or elongate-ovate, more or less reticulated, sometimes ribbed. Larva elongate, more or less slender, with few hairs, without developed prolegs on segments 7, 8 and usually 9; often remarkably like a twig of its foodplant. Pupa subterranean, or in a slight cocoon above ground.

Of this extensive sub-family we have six genera represented in New Zealand:—

- | | |
|----------------|---------------|
| 1. SELIDOSEMA. | 4. GARGAPHIA. |
| 2. SESTRA. | 5. AZELINA. |
| 3. HYBERNIA. | 6. DECLANA. |

Genus 1.—SELIDOSEMA, Hübn.

Face with appressed or shortly projecting scales. Antennae in male bipectinated, towards apex simple. Palpi rough-scaled. Thorax sometimes crested posteriorly, hairy beneath. Femora nearly glabrous; posterior tibiae in male dilated. Fore-wings in male with fovea; vein 10 sometimes connected with 9, 11 sometimes out of 10 near base only, or sometimes anastomosing with 12.

(Plate C, figs. 51, 52 neuration of *Selidosema pelurgata* and figs. 59, 60 neuration of *Selidosema productata*.)

This interesting genus comprises no less than twenty-six New Zealand species of which three are confined to the North Island, eight to the South Island, one to the Chatham Islands, and fourteen common to both islands. Most of them are forest dwellers, and highly variable. Some are very common, and from their comparatively large size, familiar insects. Owing to their great variability, the correct determination of the species is, in some cases, a matter of considerable difficulty, and the student, who has the opportunity, will do well to consult series of named specimens in a reliable collection.

The genus is universally distributed and of considerable extent.

SELIDOSEMA PELURGATA.

(*Chalastra pelurgata*, Walk., Cat. xxy., 1430; *Itana cinerascens*, Feld., Reis. Nov. pl. cxxxii., 1; *Stratocleis streptophora*, Meyr., Trans. N.Z. Inst. xvi., 106.)

(Plate XVI, figs. 14, 15 ♂ varieties; 16, 17 ♀ varieties; Plate II., fig. 4 larva.)

This species which is very abundant in the neighbourhood of Wellington, is generally distributed throughout the North Island. In the South Island it has been taken in the Otira Gorge, and at Dunedin, Otara and Invercargill.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings of the male vary from orange-brown to pale yellowish or pale slaty-brown; there is a doubly curved dark brown transverse line near the base; a broad straight line a little before the middle; an angulated line a little beyond the middle, and a curved subterminal line, usually composed of a series of triangular white dots, edged with dark brown; all these lines are much stronger on the costa, and are sometimes almost obliterated elsewhere. The hind-wings are pale yellow or whitish, with several brown-edged white spots near the tornus. The apex of the fore-wing is considerably produced, and there is a large rounded projection on the middle of the termen. The termen of the hind-wings is distinctly indented. In the female the fore-wings are pale yellow or orange, the transverse lines and white spots are usually more conspicuous, and the projections and indentations on the termen of the fore- and hind-wings larger.

This is a very variable insect, especially in the male, some specimens of which sex are very much clouded and dappled with purplish-brown especially near the termen of the fore-wings. Many of the darker forms might readily be taken for distinct species, when compared with the pale orange-brown variety, but a good series of specimens presents numerous intermediate forms completely connecting these extreme varieties. The females also vary, but are never as dark as the males.

The egg, which is laid flat, is oval slightly flattened, deep bronzy-green, with a slight depression on the side, and numerous indistinct shallow hexagonal depressions.

The larva, which feeds on ferns (*Leptopteris hymenophylloides*, *Todea* and *Alsophila*) during the spring and summer, is about $1\frac{1}{2}$ inches in length and very variable; some specimens are dull brown, with a row of green or pale brown crescentic spots down each side, and a dark brown line down the back; others are bright green, with a diagonal reddish-brown stripe on the side of each segment; the segmental divisions are reddish-brown, intersected by numerous very minute whitish lines.

The pupa is enclosed in a loose cocoon on the surface of the ground.

The perfect insect appears from September till March, and is often very common in dense forest ravines. It is frequently dislodged from the dead fronds surrounding the stems of tree-ferns, and is also met with in great abundance towards the end of summer on the blossoms of the white rata.

SELIDOSEMA ARISTARCHA.

(*Selidosema aristarcha*, Meyr., Trans. N.Z. Inst. xxiv., 216.)

(Plate XVI, fig. 30 ♂, 31 ♀; Plate II., fig. 31 half-grown larva.)

This remarkable-looking species has occurred at Kaero, on the Waitakere Ranges near Auckland, at Thames, Ohakune and Wellington, and is probably generally distributed in forest districts throughout the North Island.

The expansion of the wings varies from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. The fore-wings are light ochreous-brown; there is a small whitish edged brown spot near the base; two oblique curved brown transverse lines enclosing between them a white space towards the dorsum; a short stripe on the costa, near the middle, edged

with white towards the base of the wing; a doubly curved transverse line beyond the middle, finely edged with white towards the base of the wing; there is also a short white-edged brown stripe extending from the apex of the wing to the last-named transverse line, the two enclosing between them a small pale apical patch; there are five short longitudinal brown lines running from the termen to the outermost of the transverse lines, two of them being tipped with white towards the base of the wing. The hind-wings are dull ochreous-brown, with two very faint brown transverse lines towards the dorsum, and several whitish spots and one brown spot near the tornus. The female is a little darker in colour than the male.

This insect varies slightly in size but not otherwise.

The larva feeds on the silver tree fern (*Cyathea dealbata*) during the spring months. Prior to its last moult, it is pale green, with white sub-dorsal and lateral lines and conspicuous brown blotches on the sides of each segment, often meeting across the back. The full-grown larva is about 1 inch in length, stout, slightly attenuated towards the head; dull green mottled with white with the edges of the segments yellowish-brown; there are two conspicuous white sub-dorsal lines and two broad irregular white lateral lines, narrower at the segmental divisions; the spiracles are brown. This larva is very sluggish, resting on the silvery undersurface of the fronds of the tree-fern where it is very inconspicuous.

The pupa is concealed amongst moss, on the surface of the ground, the insect remaining in this state for about six weeks.

The moth appears from September till March, and frequents dense forests. It may be dislodged from its foodplant in the daytime or taken on the flowers of the white rata in the evening.

The silvery banded colouring of this species and of *Tortrix torogramma* are strikingly similar in general effect, and are both highly protective amongst the foliage of *Cyathea dealbata*, to which both insects are attached. In this case we have a very interesting instance of the same protective resemblance having been independently acquired by two species otherwise wholly dissimilar.

SELIDOSEMA SCARIPHOTA.

(*Selidosema scariphota*, Meyr., Trans. N.Z. Inst. xvii., 202.)

(Plate XVI., fig. 29 ♂; Plate II., fig. 19, larva.)

This very distinct species was discovered by Mr. R. M. Sunley at Makara, near Wellington. It has also occurred at Otira.

The expansion of the wings is from 1½ to 1¾ inches. The fore-wings are pale ochreous, faintly clouded with very pale purplish-brown on the basal and terminal areas; there is a broken double blackish line on the basal edge of the median band, strongest towards the dorsum, and a very interrupted blackish line on the outer edge of the median band, inwards-curved towards the dorsum; the entire wing is strewn with very short thick blackish streaks, most numerous on the median band; there is a very distinct blackish sub-apical patch, and a series of black terminal dots; the cilia are ochreous, faintly barred with grey. The hind-wings are ochreous, sometimes with very numerous faint greyish dots, and several very broken greyish

transverse lines; there is often a series of small blackish terminal dots, and the cilia are pale ochreous with a grey line.

The larva, which feeds on the native broom (*Carmichaelia*), is about 1½ inches in length, rather slender, cylindrical, almost uniform in thickness; rather dark dull green, very finely streaked with paler green; the head is pale ochreous mottled with dark grey; the legs are greenish-ochreous; there is a pale brown lateral ridge on segments 2 and 3; the prolegs and anal flap are pale brownish-ochreous mottled with darker; there is a rather indistinct pale ochreous dorsal stripe, extending from segment 9 to the posterior extremity.

This larva is sluggish in its habits, either clinging firmly to the foodplant, or sticking straight out from it like a twig. In either position it is very inconspicuous, and its colouring and general appearance highly protective.

The perfect insect appears in January. It is evidently a very rare species.

I am indebted to Mr. Sunley for specimens of both larva and imago.

SELIDOSEMA MELINATA.

(*Numeria melinata* ♀, Feld., Reis. Nov. pl. cxxix., 9; nec. Meyr.; *Selidosema pungata* ♂, Feld., ib. pl. cxxxi., 23; *Selidosema cremnopa* ♂, Meyr., Trans. Ent. Soc. Lond., 1897, 387.)

This species has occurred at Auckland.

The expansion of the wings is about 1½ inches. Antennal pectinations a 8, b 9-10. Fore-wings with termen rounded; brown, towards costa suffused with ochreous-whitish, especially posteriorly; first and second lines strong, white, first sharply angulated near costa, slightly sinuate below middle, second almost straight on upper ¾ and nearly parallel to termen, dorsal third sinuate inwards, first edged on both sides and second anteriorly with dark fuscous more broadly towards dorsum; disc suffusedly mixed with dark fuscous; a blackish transverse discal dot; a dorsal spot of white suffusion following second line; sub-terminal line fine, waved, whitish, interrupted above middle by a spot of dark fuscous suffusion, towards costa merged in a quadrate whitish-ochreous apical spot. Hind-wings light ochreous-yellowish; margins of postmedian and subterminal lines indicated by fuscous shades.

The perfect insect appears in December. Perhaps nearest to *S. productata*, but the form of the second line is wholly different.

I am unacquainted with this species. The above is taken from Mr. Meyrick's description.

SELIDOSEMA CAMPBELLI.

(*Selidosema campbelli*, Philp., Trans. N.Z. Inst. lviii., 705.)

(Plate XLVIII., fig. 34 ♀.)

This very handsome species was discovered by Mr. J. W. Campbell at Blackball, near Greymouth.

The expansion of the wings is fully 1¾ inches. The fore-wings are very pale brownish-cream-colour, slightly darker on the basal area; the median band is very broad, deep chocolate brown, its inner edge slightly concave, from about ¼ of costa to ¾ of dorsum; its outer edge from considerably beyond middle of costa to about ¾ of dorsum, there is a rather abrupt rounded projection

near the middle followed by three smaller sinuations; immediately outside the median band the ground colour of the wing is almost white; the terminal area is blackish-grey, its inner edge very irregular, with many minute strigulae, those near costa almost reaching median band. The hind-wings are brilliant orange, paler near base; the basal third is densely sprinkled with blackish-grey strigulae, and there are a few irregular clusters of darker strigulae near tornus. The head, thorax, and abdomen are pale brownish-ochreous. The antennal pectinations are about 4.

The perfect insect appears in December.

Described and figured from the unique specimen kindly lent to me by Mr. Philpott.

SELIDOSEMA FASCIALATA.

(*Selidosema fasciata*, Philp., Trans. N.Z. Inst. xxxv., 248, pl. xxxii., 7.)

(Plate XVI., fig. 1 ♂, 2 ♀.)

This species, which is very closely allied to *Selidosema productata*, has occurred in the North Island on Mount Egmont and in the South Island at Nelson, Otira, Dunedin and Invercargill. It has also been taken at Stewart Island.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female $1\frac{1}{8}$ inches. The fore-wings of the male have the basal patch pale brown and the first line slightly curved, usually rather broad and clear white; there is a very distinct dark chocolate brown median band followed by the second line which is white with a slight indentation below the costa and a very slight rounded projection below the middle; the subterminal area is pale ochreous; there is a broad pale brown terminal band with cloudy dark brown patches below the apex and near the tornus, these being traversed by a very broken wavy white subterminal line. The hind-wings are pale ochreous. The female has similar markings but is very much paler than the male.

There is no variation except in the depth of the colouring.

The perfect insect appears from January till March, and frequents forest. It may also be taken on the flowers of the ragwort (*Senecio jacobaea*). Although very similar to *Selidosema productata*, it can always be separated from that species by the peculiar form of the outer margin of the median band of the fore-wings.

SELIDOSEMA PRODUCTATA.

(*Larentia productata*, Walk. Cat. xxiv., 1197; *Selidosema* (?) *fragosata*, Feld. Reis. Nov. pl. cxxxi., 29; *Zylobara productata*, Meyr., Trans. N.Z. Inst. xvi., 98; *Selidosema fluminea*, Philp., Trans. N.Z. Inst. lvi., 389.)

(Plate XVI., figs. 9 and 10 ♂ varieties, 11 ♀. Plate XLVIII., fig. 26 ♂ sub-alpine variety.)

This species is common, and generally distributed throughout both the North and South Islands. It has also occurred at Stewart Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings vary from deep yellowish-brown to rich chocolate-brown usually covered with numerous small darker brown streaks; the first line is paler slightly bowed towards the termen, the second line outwards-curved near the middle, the two usually enclosing a rather distinct dark median band; the subterminal area is paler with disconnected dark patches below the apex and above

the tornus; there is a jagged, whitish subterminal line *always broken in the middle*, and often shaded with black towards the base of the wing. The hind-wings are ochreous, speckled with brown towards the dorsum; there is usually a brown discal dot. In the female the colouring is usually much paler than in the male; the first, second, and subterminal lines are often strongly marked in white, and there are sometimes cloudy white patches on the sub-basal and subterminal areas.

This is a rather variable insect. In some specimens the colouring is almost uniform rich brown, and the characteristic markings can only be detected with difficulty. It may, however, be distinguished from the allied species by the very long antennal pectinations in the male, the *interrupted pale jagged subterminal line and the absence of greenish colouring*.

The eggs are oval-globose with numerous rows of hexagonal facets; they are pale green in colour and are laid irregularly in heaps adhering to each other, and to the surface on which they are deposited, by their sides; they turn bright reddish-brown a few days after being laid. The length of the egg is about one-fortieth of an inch.

The young larva, when first hatched, is much attenuated, pale ochreous with two very broad crimson-brown sub-dorsal lines and numerous black bristles on posterior segments. The full-grown larva measures about $1\frac{1}{2}$ inches in length; it is rather slender and has a large hump on the sixth segment. Its colour is dark reddish-brown, mottled and striped with dull white and greenish.

It feeds on the white rata (*Metrosideros scandens*). During the day it firmly grasps a stem of its foodplant with its prolegs, holding the rest of its body out from the branch in a perfectly straight and rigid position. When in this attitude it so exactly resembles a twig, that, even in the case of captive specimens, it is often a matter of the greatest difficulty to find a caterpillar amongst the branches. Several times I have even caught hold of a larva, thinking it to be a twig, so perfect is the resemblance. At night these larvae become much more active, and by the aid of a lantern they may then be seen busily walking about and feeding.

The pupa is enclosed in a slight cocoon about two inches below the surface of the earth. The larvae of the autumnal brood remain in this condition during the winter, but in the case of the spring and summer broods the pupa state only occupies a few weeks.

The moth appears from October till May. It is very common in forest regions, and may be observed resting on the trunks of the trees, its pale yellow hind-wings being completely concealed by the deep brown fore-wings. In this position the insect is almost invisible, and the protection afforded by its colouring is at once apparent. In the autumn evenings it is often very abundant at the blossoms of the white rata.

A very handsome form of *S. productata*, discovered by Mr. Philpott in the Flora River Valley, Mount Arthur, and recently described by him as *S.*

fluminea, is figured on Plate XLVIII., fig. 26. Intermediate forms, between this and the varieties of *S. productata* depicted on Plate XVI., are in my collection.

SELIDOSEMA MODICA.

(*Selidosema modica*, Philp., Trans. N.Z. Inst. lili., 339.)

The original specimens of this insect were captured by Mr. E. S. Gourlay on the Lyttelton Hills, near Christchurch, and other collectors have since taken it in the same locality.

It is distinguished from *Selidosema productata* by its dark brownish-grey fore-wings with very indistinct markings. The hind-wings are also very heavily peppered with grey. The antennal pectinations are stated to be shorter than in *S. productata*.

The perfect insect appears in February and March. It is evidently extremely local.

SELIDOSEMA INDISTINCTA.

(*Pseudocoremia indistincta*, Butl., Proc. Zool. Soc. Lond. 1877, 594, pl. xliii., 8; *Pseudocoremia melinata*, Meyr. (nec. Feld.), Trans. N.Z. Inst. xvi., 99; *Selidosema melinata*, Huds., N.Z. Moths, 85 pl. ix., 15 ♂, 16 ♀.)

(Plate XVII., fig. 1 ♂, 2 ♀; Plate II., fig. 15 larva.)

This species is very common, and generally distributed throughout the country.

The expansion of the wings is about 1½ inches. The fore-wings of the male are dull greenish-grey, with black and white markings; there is a blackish transverse line near the base; another near the middle, followed by a very broken irregular line then a broader, pale area usually composed of a number of confluent white blotches, followed by a series of cloudy black marks, and a very wavy pale subterminal line. The hind-wings are ochreous mottled with pale brown near the dorsum; there is a series of black dots on the termen of both fore- and hind-wings. The fore-wings of the female are dull brown, faintly tinged with green; all the markings are very indistinct, and there are no clear white patches as in the male.

This insect is rather variable, but apart from the next species, may be recognised by its greenish tinge, and the absence of indentations on the termen of both fore- and hind-wings. Near Dunedin a variety occurs in which the whole of the space between the first and second lines is suffused with brownish-black.

The larva, which feeds on *Astelia* and *Mühlenbeckia*, is about 1 inch in length, considerably flattened and rapidly tapering at the posterior extremity; brownish-green on the back and pale green underneath; there is a very conspicuous slightly wavy brown lateral line and two faint interrupted brownish-green dorsal lines; the head is yellowish-brown dappled with darker brown, and the spiracles are white with fine black rings; the prolegs are very small.

This larva is very sluggish in its habits, seldom walking. When feeding on the *Astelia* it lives between the large leaves of that plant, its flattened shape enabling it to safely retreat to the bases of the leaves where it is secure from all enemies.

The perfect insect appears from November till March, and is generally very abundant in all wooded districts. It

is also common in beech forests on the mountain sides, where it may be taken at altitudes of from 3,000 to 4,000 feet above the sea-level. In the lowlands I have observed as many as half a dozen specimens on a single moss-covered tree-trunk. Whilst resting in this situation they are very inconspicuous, the colouring of the fore-wings harmonising perfectly with the insect's surroundings, and the pale-coloured hind-wings being then entirely concealed by the upper pair. In connection with this fact it is very interesting to notice that in all those cases where the hind-wings are exposed to view during repose, they are protectively coloured in a similar manner to the fore-wings. It will be observed that *Selidosema dejectaria* and *S. panagrata* exhibit protective colouring on both pairs of wings, these being invariably exposed when those insects are at rest.

SELIDOSEMA LACTIFLUA.

(*Selidosema lactiflua*, Meyr., Trans. N.Z. Inst. xliv., 117.)

(Plate XVI., fig. 27 ♂, 28 ♀.)

This fine species occurs fairly commonly in the Routeburn Valley beyond the head of Lake Wakatipu, and has also been taken near Dunedin.

The expansion of the wings is almost 1½ inches. Although somewhat larger, the male in this species is extremely similar to the same sex in *S. indistincta*; the apex of the fore-wing of the present insect is, however, slightly more acute and the white markings more diffused. In the female of *S. lactiflua* the ground colour of the fore-wings is a peculiar opalescent grey, quite different to the female of *S. indistincta*, and the markings, which are blackish-green are very much more distinct.

The perfect insect appears in February, and is found in forest. It is evidently very local.

SELIDOSEMA TERRENA.

(*Selidosema terrena*, Philp., Trans. N.Z. Inst. xlvii., 196.)

(Plate XVI., fig. 34 ♂.)

This very large and rather striking species was discovered by Mr. H. Hamilton on Bold Peak, at the head of Lake Wakatipu. It has also occurred at Lake Harris and on Mount Cleughearn, Hunter Range, at an altitude of about 3,000 feet.

The expansion of the wings of the male is 1½ inches. The fore-wings, which have the termen very slightly wavy and oblique, are very pale brownish-ochreous, rather densely speckled and marked with brownish-black; the first line is double, slightly outwards curved and interrupted; there is a very broken line near the middle of the wing, followed by a conspicuous black discal dot; the second line is indistinct, almost straight; the subterminal line consists of several detached spots. The hind-wings are white, clouded with very pale brownish-ochreous towards termen, faintly speckled with darker grey, and with indistinct discal spot and terminal dots. All the cilia are pale brownish-ochreous barred with blackish.

The perfect insect appears from December till February, and may be looked for near the upper edge of sub-alpine forests in the far south.

Described and figured from a specimen in Mr. Oliver's collection.

SELIDOSEMA LEUCELAEAE.

(*Selidosema leucelaeae*, Meyr., Trans. N.Z. Inst. xli, 6; *Selidosema productata*, Huds., N.Z. Moths, pl. ix., 10, 14.)

(Plate XVI., fig. 12 ♂, 13 ♀; Plate II., fig. 14 larva.)

This handsome species has occurred at Ohakune, Masterton and Wellington in the North Island, and at Christchurch, Otira, Mount Cook, Dunedin and Invercargill in the South Island. It is probably fairly common wherever miro, or totara trees, are abundant.

The expansion of the wings is about 1½ inches. The forewings of the male are rich yellowish-brown clouded with blackish along the costa, in the disc and on the veins; the first and second lines are very indistinct or obsolete; there is a conspicuous series of creamy-white blotches on the subterminal area forming an irregular broken band; another series of four smaller blotches parallel to the dorsum, and a very wavy whitish subterminal line. The hind-wings are ochreous tinged with grey, and with faint traces of a brownish subterminal line. The pectinations of the antennae of the male are much shorter than in either *Selidosema productata* or *S. fasciata*. In the female the white markings on the forewings are very much more extensive and irregular, and the ground colour much darker which gives the entire wing a black and white mottled appearance with a broad white subterminal band. The hind-wings are greyish-ochreous with a grey discal dot, and two wavy grey subterminal lines.

There is slight variation in both sexes in respect of the depth of the ground colour of the forewings, and the extent of the white markings.

The egg is oval, slightly smaller at one end, with the surface strongly honey-combed; its length is about one-thirty-second of an inch, and its colour is pale green, becoming pale pink about a week after being laid.

The young larva, when first hatched, is about ¼ inch long, very slender, with the head ochreous-brown and the body yellowish-green; there are two broad reddish-brown lateral lines, which become confluent on the last two segments, and a few short black bristles. After the second moult the larva is pale brown, with obscure darker brown dorsal and sub-dorsal lines.

The full-grown larva is about 1½ inches in length; the head is very small, dark brown, with shining black markings; the body is rather slender, stouter posteriorly, with a pair of humps on the back of segments 6, 9 and 12; its general colour is yellowish-brown with numerous fine irregular dark brown wavy markings; the skin of the larva is somewhat wrinkled and roughened; there is a series of large elongate-oval dull green spots on the back of segments 2 to 8 inclusive, and a series of similar markings on the sides of segments 5 to 8 inclusive; the second segment is almost entirely green, and there are obscure greenish patches on the sides of segments 11 and 12; a few isolated black bristles are scattered over the larva. Some larvae are wholly brown, whilst others have the green markings much larger than usual, there being considerable variation in this respect.

This caterpillar is fairly active at night, or when disturbed. During the daytime, however, it clings firmly to a twig with its prolegs, holding its body rigidly extended and in this position defies detection. The foodplants are miro (*Podocarpus ferrugineus*) and totara (*P. totara*), and the general colouring and shape of the larva causes it

to resemble, in the closest possible degree, the twigs of those trees. It is in fact a most perfect instance of the simultaneous development of structure, colour, and instinct for protective purposes.

The perfect insect appears from October till March, and frequents forests where miro and totara trees are abundant. It is sometimes found at considerable elevations. The beautiful mottled colouring of the forewings is very protective, when the insect is resting on lichen covered tree-trunks.

SELIDOSEMA MONACHA.

(*Selidosema monacha*, Huds., Trans. N.Z. Inst. xxxv., 245 pl. xxx., 4; *Selidosema maculosa*, Howes, ib. xli., 96.)

(Plate XVI., fig. 25 ♂, 26 ♀.)

In the North Island this very striking species has occurred commonly near Whakapapa, at about 4,000 feet, on the lower slopes of Mount Ruapehu. In the South Island it has been found at Otira, and on the Lake Harris track (3,000 feet), near the head of Lake Wakatipu.

The expansion of the wings of the male is 1½ inches; of the female fully 1½ inches. The forewings are white traversed by numerous broken, jagged transverse lines; in the male these lines are more suffused, mixed with yellowish-brown, and the discal area is heavily sprinkled with blackish scales; in both sexes there is a terminal series of black dots, and the cilia are white barred with black. The hind-wings are greyish-ochreous in the male, pale grey in the female; there is a darker discal dot; a strong slightly waved transverse line below the middle, and several paler lines towards the termen.

Sometimes the black transverse lines are very much suffused and in these individuals the black colouring predominates.

The female of *Selidosema leucelaeae* has a superficial resemblance to the present insect. I am, however, confident that the two species are absolutely distinct.

The larva, which feeds on *Phyllocladus alpinus* in January, is about 1 inch in length, cylindrical, of almost uniform thickness; there is a distinct wart on the back of segment 12. General colour, dull green with black markings, each mark thickly speckled with greyish-white and dull reddish; there are two indistinct sub-dorsal lines on segments 2-4; conspicuous sub-dorsal blotches on segments 5-9; minute black white-centred sub-dorsal spots on segments 10 and 11; the whole of the back of segments 12 and 13 is blackish speckled with grey, the wart dull red. No distinct lateral markings. The head is reddish-grey, darker behind, with a black stripe down each side. Legs reddish-grey barred with black. Prolegs grey speckled with black. The larva is well protected when resting on the stems of its foodplant.

The perfect insect appears from November till February, and may be looked for on mountains towards the upper edge of the forest.

SELIDOSEMA ALBIFASCIATA.

(*Selidosema albifasciata*, Philp., Trans. N.Z. Inst. xlvii., 196.)

(Plate XVII., fig. 3 ♂, 4 ♀.)

This very mottled-looking species has occurred at Taihape and Feilding in the North Island, and in Central Otago in the South Island.

The expansion of the wings is slightly over 1½ inches. *The fore-wings of the male are pale cream colour mottled with lighter and darker brown; there are faint basal and sub-basal patches; an irregular darker median band; a large, very dark, almost rectangular patch at the apex and a faint mottling on the tornus; several of the brown patches are partly edged with cloudy yellow. The hind-wings are very pale ochreous. In the female the ground colour of the fore-wings is faintly tinged with purplish, there are no distinct broken markings near the base of the wing; the median band consists of a wavy brown line with a blotch on the dorsum and there is a conspicuous blackish-brown blotch below the apex; all the darker brown markings are surrounded with a more or less distinct yellow clouding, this feature being more evident than in the male.*

The perfect insect appears in February and March.

Described and figured from the type specimens in the Dominion Museum.

SELIDOSEMA OCHREA.

(*Selidosema ochrea*, Howes, Trans. N.Z. Inst. xliii., 127, pl. i., 1.)

(Plate XLVIII., fig. 27 ♂.)

This species was discovered by Mr. G. W. Howes at Woodhaugh, near Dunedin. It has also occurred on the Lyttelton Hills, near Christchurch.

The expansion of the wings is about 1½ inches. *The fore-wings are dull brownish-grey mixed with blackish-grey; there is a small irregular, ochreous basal patch, followed by a slender blackish transverse line, acutely angulated above the middle; the outer edge of the median band has a very prominent rounded projection slightly above the middle, and the subterminal line has seven sharp dentations; the space between the median band and the subterminal line is bright ochreous. The hind-wings are bright ochreous.*

The perfect insect appears from February till April, and is attracted by sugar.

Described and figured from a specimen kindly lent to me by Mr. Clarke.

SELIDOSEMA SUAVIS.

(*Pseudocoremia suavis*, Butl., Cist. Ent. ii., 497; *Pachyencemia usitata*, Butl., Cist. Ent. ii., 501; *Pseudocoremia lupinata* Meyr., Trans. N.Z. Inst. xvi., 98; *Boarmia suavis*, Meyr., Trans. N.Z. Inst. xxiii., 101.)

(Plate XVI., figs. 18, 19 ♂ varieties; 20, 21, 22 ♀ ditto; Frontispiece fig. 18 egg; Plate II., fig. 22 larva.)

This species is very common and generally distributed throughout the country and occurs on Stewart Island.

The expansion of the wings of the male is 1½ inches; of the female about 1¾ inches. *The forewings of the male are pale brown, speckled and mottled with darker brown; there is a double transverse line at about ⅓; a very conspicuous transverse line near the middle, which is abruptly bent outwards towards the tornus before it reaches the dorsum, and a double jagged subterminal line. The hind-wings are ochreous, often mottled*

or streaked with brown near the termen. In the female the transverse lines are usually less distinct, and the brown speckling often much denser on both fore- and hind-wings.

This insect is very variable, hardly two specimens being exactly alike. In some individuals of both sexes all the markings are very indistinct, the fore-wings being very heavily speckled with brown; in others the median area is clouded with rich brown. Some female specimens have a very broad well defined dark brown median band, whilst others have the fore-wings almost entirely ochreous, with the usual transverse markings indicated by interrupted brown lines. In all these forms, however, the peculiar outline of the second line on the fore-wings is always traceable and constitutes a reliable distinctive character.

The egg, which is laid on its side, is oval, pale green, slightly more pointed at one end, and covered with numerous fine ribs and cross reticulations, not very regularly arranged. It turns dull red a few days after being laid.

The larva feeds on the white rata (*Metrosideros scandens*), the red rata (*M. robusta*), the tawa (*Beilschmiedia laura*) and *Leucopogon fasciculatus*. It is considerably flattened and of even thickness throughout; the upper surface is reddish-brown, often with numerous blackish stripes and green and white markings which give it a very variegated appearance; the under side is pale green; there are two small tubercles on the back of the ninth segment, and a row of short filaments on each side below the lateral line. Some larvae are uniform dull green without distinct markings; others greyish-white finely mottled with blackish-grey.

The pupa is concealed amongst refuse on the ground.

The perfect insect appears from September till May, and is often seen on mild days in the middle of winter. It is common in forest districts, where it is usually seen resting on tree trunks in which situation its colouring affords it efficient protection. With the extension of settlement it has become extremely abundant in gardens and other cultivated places, its larva feeding freely on *Cupressus macrocarpa*.

SELIDOSEMA PROTOTOXA.

(*Selidosema prototoxa*, Meyr., Trans. N.Z. Inst. II., 350.)

(Plate XLVIII., fig. 23 ♂, 24 ♀.)

This rather small, dull-looking species was discovered by Mr. Creagh O'Connor at Tokaanu. Mr. H. Hamilton has also found it on Hen Island, North of Auckland.

The expansion of the wings of the male is 1½ inches of the female 1¾ inches. *The fore-wings are very dull ochreous-brown, very slightly tinged with rusty-brown, especially in the female and heavily speckled with blackish-grey, particularly on the dorsal and central areas; there is a conspicuous longitudinal whitish mottling on the sub-dorsal area, plainest in the female and traces of a similar mottling on veins 6, 7, and 8, the veins themselves being somewhat darkened; there is a short oblique blackish basal streak and, in the female on the dorsum only, distinct fine brown divergent transverse lines at about ⅓ and ⅔, these lines being hardly traceable beyond the disc. The hind-*

wings are pale ochreous-brown, in the female strongly sinuate below the apex, in which sex there is also a cloudy subterminal line.

The perfect insect appears in April. This species may be recognised by its small size, dull colouring and very indefinite markings.

SELIDOSEMA LUTEA.

(*Selidosema lutea*, Philp., Trans. N.Z. Inst. xvi., 119.)

(Plate XVI., fig. 32 ♂, 33 ♀.)

This very fine species was discovered by Mr. C. Fenwick on Bold Peak, at the head of Lake Wakatipu, at an elevation of about 3,500 feet above the sea-level.

The expansion of the wings is about 1½ inches. The fore-wings, which have the apex slightly hooked and the termen strongly bowed, are warm ochreous-brown; there is a very jagged broken blackish transverse line near the middle of the wing, distinctly marked on the dorsum and in the disc. The hind-wings are very pale ochreous, clouded with pale brown on the termen; there is a small round black discal spot. All the wings have a few very minute blackish terminal dots. In the female the apical patch and inner median area of the fore-wings is faintly clouded with whitish.

The perfect insect appears from December till February, and may be looked for at the upper edge of the beech forest on high mountains.

Described and figured from specimens in the Dominion Museum.

SELIDOSEMA LUPINATA.

(*Cidaria lupinata*, Feld., Rel. Nov. pl. cxxxi., 19; *Pseudocoremia lupinata*, Butl., Cist. Ent. ii., 496; *Boarmia lupinata*, Meyr., Trans. N.Z. Inst. xxlii., 101; *Selidosema humillima*, Huds., N.Z. Moths, 83, pl. ix., 5; *Selidosema lupinata*, Meyr., Trans. N.Z. Inst. xli., 7.)

(Plate XVII., fig. 5 ♂, 6 ♀.)

This rather inconspicuous species has occurred at Paekakariki, Wellington, Dunedin and Invercargill.

The expansion of the wings is from 1½ to 1¾ inches. The fore-wings are pale dull pinkish-brown; there are three short oblique dark brown stripes on the costa, inclined very much towards the termen; the first of these stripes is distinctly double, and the second and third partially so; there is an indistinct brown mark just below the apex, several slender faint streaks on the veins near the middle of the wing, and a very distinct brown shading on the dorsum. The hind-wings are very pale ochreous. In the female the sub-apical marking is darker and both fore- and hind-wings are more or less sprinkled with brown.

This species may be distinguished from the other species of the genus by the peculiar ground colour of the fore-wings and the obliquity of the costal stripes. In *S. lupinata* the costal markings slope very rapidly from the base towards the termen; in other allied species these markings are but slightly inclined, and in some slope in the reverse direction.

The perfect insect appears from December till June. It seems to frequent cultivated places, but is not by any means a common species.

SELIDOSEMA RUDIATA.

(*Cidaria rudisata*, Walk., Cat. xxv., 1420; *Boarmia astrapia*, Meyr., Trans. N.Z. Inst. xxii., 218; *Boarmia rudiata*, Meyr., Trans. N.Z. Inst. xxiii., 101.)

(Plate XVI., fig. 23 ♂; 24 ♀, large southern form; Plate II., fig. 20, larva.)

This species is fairly common in the neighbourhood of Wellington, and has occurred at Kaco, North of Auckland, Thames, Arthur's Pass, Otira, Dunedin, Invercargill and Stewart Island. It is probably generally distributed throughout the country.

The expansion of the wings of the male is 1½ inches, of the female 1¾ inches. The fore-wings are very pale ochreous-brown; there is a double interrupted jagged transverse line near the base; a rather indistinct line in the middle; a double, nearly continuous jagged transverse line beyond the middle; a double jagged subterminal line completely interrupted in the middle, and generally a dark patch on the termen just below the apex. The hind-wings are pale ochreous with a very indistinct subterminal line. There is a series of black dots on the termen of both fore-wings and hind-wings and the termen of the hind-wing is slightly indented.

This species varies a good deal in size; the specimens from the south are considerably larger and have more distinct markings, than those found in the vicinity of Wellington.

The egg is oval, slightly squared at one end, pale bronzy-blue, with numerous hexagonal depressions irregularly arranged.

The larva when full-grown is about 1½ inches in length, cylindrical, of even thickness throughout, and almost uniform dull greyish-brown in colour, occasionally with a series of small oblong black marks on segments 5, 6, 7, 8, and 9. It is also sometimes irregularly streaked and mottled with blackish. It feeds on the young leaves and buds of ake ake (*Olearia forsteri*), *rangiora* (*Brachyglottis repanda*) and *tauhinu* (*Cassinia*). It is extremely difficult to find as it almost exactly resembles a twig of its foodplant, on which it remains motionless for hours at a time. Full-grown larvae are met with in November and April, so that there appear to be at least two broods in a season.

The pupa is concealed in the earth.

The perfect insect appears from October till May. It seems to prefer cultivated districts, and is generally observed at rest on garden fences or tree-trunks. It also frequents flowers in the evening.

SELIDOSEMA AMPLA.

(*Selidosema ampla*, Huds. Ent. Mo. Mag. lix., 129.)

(Plate LI., fig. 8 ♂.)

This very broad-winged species was discovered by Mr. F. S. Oliver at Stoney Creek, near Glenorehy, at the head of Lake Wakatipu.

The expansion of the wings is 1¾ inches. The fore-wings are very broad with the termen hardly waved and very oblique, pale brownish-ochreous strongly tinged with grey, with the principal veins broadly marked in ochreous; the first, median and

second lines are obscure, dentate and much interrupted; the subterminal line is double, strongly waved, with a very pronounced sinuation below the apex; the inner subterminal line is much more strongly marked below costa and on veins 5, 2 and 1; there is a series of conspicuous terminal dots. The hind-wings are very broad, with the termen hardly waved, pale greyish-ochreous, strongly clouded with grey on the terminal third; there are several indistinct dots near the middle of the termen. The cilia of all the wings are greyish-ochreous.

This species is evidently very closely allied to *Selidosema rudiata*, of which it may possibly prove to be an extreme form, although I hardly think this likely. It differs from all the varieties of *S. rudiata* in its broader wings, less oblique termen and greyish colouring.

The perfect insect appears in January, and may be looked for in forest at about 2,500 feet above sea-level.

SELIDOSEMA FENERATA.

(*Rhyparia fenerata*, Feld., Reis. Nov. pl. cxxxI., 7; *Zylobara fenerata*, Butl., Cist. Ent. ii., 498. Meyr., Trans. N.Z. Inst. xvi., 97.)

(Plate XVII., fig. 13 ♂, 14 ♀; Plate II., fig. 24 larva.)

This species is common, and generally distributed throughout the country, except in the extreme south where its place seems to be taken by *Selidosema argentaria*.

The expansion of the wings is about 1½ inches. The fore-wings of the male are very pale ochreous-brown; there is a double jagged transverse line near the base, a single jagged line a little before the middle, a double one a little beyond the middle and an almost continuous jagged subterminal line. The hind-wings are very pale ochreous, almost white; their outline is peculiar; the dorsum is very short, the termen very long, first oblique and then rounded with a small projection midway between the apex and the tornus. The female has the fore-wings pale grey, and the hind-wings dull white; the markings resemble those of the male, but the outline of the hind-wing is of the usual form with a rounded projection in the middle of the termen.

This insect varies slightly in the depth of its colouring. With the single exception of *S. argentaria*, it may be immediately distinguished from the allied species by the peculiar outline of the hind-wings in the male, and by the pale grey colouring of the female.

The larva, which feeds on rimu (*Dacrydium cupressinum*), and *Cupressus macrocarpa*, during the late summer and autumn, is very handsome. Its length when full-grown is about 1 inch. The general colour is vivid green, with shining white markings. There is a broad white lateral line, with an interrupted yellowish line above it; a series of large crescentic marks down the back, with a white dash in the middle of each; two interrupted subventral white lines; the spiracles are black and the head green, with a rusty-brown mark on each side; the segmental divisions are yellowish. This larva is very inconspicuous amongst the foliage of both foodplants and its colouring is evidently protective.

The pupa is concealed about 1 inch below the surface of the earth.

The perfect insect appears from October till April, and is often very common, especially in gardens. In forest

districts it has a great liking for the faded fronds of tree-ferns, from which specimens may often be dislodged. Both sexes are very abundant at various blossoms during the evening, and are also attracted by light. The female is occasionally observed in winter and probably hibernates.

SELIDOSEMA ARGENTARIA.

(*Selidosema argentaria*, Philp., Trans. N.Z. Inst. xlv., 77.)

(Plate XVII., fig. 11 ♂, 12 ♀.)

This species has occurred at Christchurch, Dunedin, Wyndham, Invercargill, Wallacetown and Tutaran, and is probably generally distributed throughout Southland.

The expansion of the wings is slightly over 1½ inches. It is extremely closely allied to *Selidosema fenerata*, from which it differs in the following respects:—The peculiar outline of the hind-wings of the male is not so pronounced, being less oblong and the dorsum being rounded instead of angular; the colour of the fore-wings of the male is pale grey slightly darker than in the female. In addition the female has shorter and broader fore-wings, and both sexes in *S. argentaria* are slightly smaller than in *S. fenerata*.

The perfect insect appears from December till May, and is most abundant in the autumn on the flowers of *Senecio jacobaea*. It must be regarded as the southern representative of *S. fenerata*, and may, perhaps, ultimately prove to be merely a local race of that species.

I am indebted to Mr. Philpott for specimens.

SELIDOSEMA OMBRODES.

(*Selidosema ombrodes*, Meyr., Trans. Ent. Soc. Lond. 1902, 275.)

(Plate XLIV., fig. 6 ♂.)

This sombre-looking species is very common on the Chatham Islands.

The expansion of the wings is about 1½ inches. The fore-wings are dull yellowish-brown darker towards the base; there is a very strongly bowed blackish line at about ¼; an elongate discal dot beyond the middle; a slightly curved transverse line at about ½, and an indistinct warmer brown subterminal band and tornal blotch. The hind-wings are greyish-ochreous slightly tinged with brown towards the termen.

This species is perhaps nearest to *S. productata* but larger and more sombre and distinguished from it and all similar New Zealand species by the grey hind-wings, the very long antennal pectinations of the male are also noticeable.

Described and figured from a specimen kindly given to me by Mr. Meyrick.

SELIDOSEMA PANAGRATA.

(*Scotosia panagrata*, Walk., Cat. xxv., 1360; *Angerona menanaria*, Walk., Cat. xxvi., 1500; *Epirrhantthis* (?) *antipodaria*, Feld., Reis. Nov. pl. cxxvi., 3; *Hyperpythra desiccata*, Butl., Cist. Ent. ii., 495; *Hyperpythra arcacea*, Butl., Cist. Ent. ii., 495; *Barsine panagrata*, Meyr., Trans. N.Z. Inst. xvi., 100.)

(Plate XVII., figs. 20, 22 ♂ varieties; 21, 23 ♀ ditto; Plate II., fig. 25 larva.)

This extremely variable species is very common, and generally distributed throughout the country. It has also occurred at Stewart Island.

The expansion of the wings is from $1\frac{1}{2}$ to $1\frac{1}{4}$ inches. The fore-wings of the male vary from pale ochreous to rich brown or dark brownish-black; there is a jagged transverse line near the base; a large black or white discal spot; a doubly curved transverse line without indentations beyond the middle, then a very jagged transverse line, followed by several paler markings, and an obscure subterminal line. The hind-wings are paler in colour; there is a slightly curved transverse line near the base; a jagged line near the middle, and a very faint line beyond the middle. The termen of both fore- and hind-wings is slightly indented. The female varies from pale ochreous to dark slate-colour; the markings resemble those of the male, but the termen of the wings is more indented.

This species is so extremely variable that a more detailed description would be useless; its numerous forms are, however, best recognised by the *unbroken jagged transverse lines of both fore- and hind-wings*.

The eggs are laid in adherent clusters of three or four up to a dozen. They are very pale green, cylindrical, covered with reticulating rows of hexagonal depressions. The micropyle is apparently surrounded with irregular hexagons.

The larva is quite as variable as the perfect insect. When very young it is bright green, with a conspicuous white dorsal line; as age advances the caterpillar becomes dark olive-brown, sometimes striped with paler brown or green, whilst many specimens retain the green colouring throughout the whole of their lives. The favourite food-plant is the kawa-kawa (*Macropiper excelsum*), which the larvae voraciously devour, and, with the native slugs, cause the riddled appearance which the leaves of that plant almost invariably present. These larvae often select a forked twig to rest in, where they lie curled round, with the head and tail close together. Other foodplants are *Aristolelia racemosa* and *Myrtus bullata*. Those caterpillars found on the latter plant are strongly tinged with pink, and are consequently very inconspicuous amongst the young shoots, where they generally feed. The burrows of the larvae of *Hepialus virescens* are frequently utilised by the caterpillars, which feed on the *Aristolelia*, as convenient retreats during the winter. When full-grown these caterpillars descend to the ground and construct loose cocoons of silk and earth on the under sides of fallen leaves. The moth usually emerges in about a month's time, but the autumnal larvae either hibernate or remain in the pupa state throughout the winter.

The perfect insect appears from October till April. It frequents forest and is extremely common. It also occurs in great abundance on the white rata blossoms in the autumn, and specimens may be occasionally seen even in the depth of winter.

SELIDOSEMA DEJECTARIA.

(*Boarmia dejectaria*, Walk., Cat. xxi., 394; *Boarmia attracta*, Walk., Cat. xxi., 394; *Boarmia exprompta*, ib., 395; *Tephrosia patularia*, ib., 422; Butl., Cat. N.Z. Lep. pl. iii., 8; *Tephrosia scriptaria*, Walk. Cat., xxi., 422. *Scotosia crebri-nata*, ib. xxv., 1358; *Scotosia stigmatica*, ib., 1359; *Scotosia lignosata*, ib., 1361; *Gnophos pannularia*, Guen., Ent. Mo. Mag. v., 42; *Scotopteryx maoriata*, Feld. Reis. Nov. pl. cxxvi., 4; *Hemerophila* (?) *sulpiata*, ib., 7; *Hemerophila caprimulgata*, Feld., ib., 12, *Boarmia dejectaria*, Meyr., Trans. N.Z. Inst. xvi., 100.)

(Plate XVII., fig. 24 ♂; 25, 26 ♀ varieties; Frontispiece fig. 19 egg.)

This large insect is very common, and generally distributed throughout the country. It has also occurred at Stewart Island.

The expansion of the wings is from $1\frac{1}{2}$ to 2 inches. The fore-wings vary from pale ochreous to very dark rich brown; there is an oblique transverse line near the base, sometimes enclosing a slightly darker basal patch; a dark brown discal dot surrounded by a ring; a very oblique, wavy, transverse line beyond the middle, often double towards the dorsum, and several irregular markings on the termen; there is often a white spot on the middle of the termen, and a pale apical patch. The hind-wings resemble the fore-wings in colour; there are one or two obscure transverse lines near the base, generally forming a darker basal patch; a wavy line near the middle, and a strongly shaded subterminal line. The termen of both the wings is indented, the depth of the indentations varying greatly in different specimens.

This insect is very variable, but its large size and *very oblique transverse lines* on the fore-wings suffice to distinguish it from the allied species.

The egg is slightly under one-thirty-second of an inch in length, oval, rather irregular in shape, rich dark green, covered with very large hexagonal depressions; at each of the angles of each hexagon there is a minute brilliant white point. The eggs are deposited in irregular batches, loosely fixed together and loosely attached to the object on which laid. As development progresses the egg becomes dark reddish-brown but the bright points remain unchanged and give the egg a very brilliant spangled appearance.

The larva feeds on a great variety of shrubs, mahoe (*Melicytus ramiflorus*), white rata (*Metrosideros scandens*), fuchsia (*Fuchsia excorticata*), "lawyer" (*Rubus australis*), tutu (*Coriaria*), supplejack (*Rhipogonum scandens*) and poro-poro (*Solanum aviculare*) being amongst the number. The caterpillar may usually be recognised by a large hump, which is situated on each side of the third segment. Its colouring appears to be so entirely influenced by its surroundings that a description is impossible. For instance, larvae taken from the pale green foliage of the mahoe resemble in colour the twigs of that plant; others captured feeding on the white rata are dark reddish-brown, those from *Solanum aviculare* are purplish slate-colour, whilst those from the fuchsia are pale olive-green tinged with brown, like the sprouting twigs.

This larva may be found plentifully during the whole of the summer and early autumn. It is most troublesome

to the collector as its certain identification is often a matter of considerable difficulty, especially during the earlier stages of its life. When at rest the first and second pairs of legs are closely appressed to the body forwards, and the third pair held straight downwards in which position they resemble a short twig or broken thorn; the body of the larva as is usual in Geometers, closely simulates a branch of the foodplant, but the position assumed by the legs when at rest, is I think peculiar to the larva of the present insect.

The pupa is enclosed in a slight cocoon situated about two inches below the surface of the ground. Most of the larvae which become full grown late in the autumn remain as pupae during the winter, but the summer broods only remain in the pupa state a few weeks.

The perfect insect appears from November till May, and is sometimes met with in the middle of winter, hibernated specimens occurring in the early spring. This insect has a great partiality for resting with outspread wings on the walls of sheds and outhouses, where it is frequently noticed by the most casual observer. It is very common in most situations, and may be taken in large numbers at sugar, light, or blossoms, during the whole of the summer. Its extreme abundance and great variability, in both the larval and imago states, would render it a good subject for a series of experiments on heredity.

Genus 2.—SESTRA, Walk.

Face smooth. Antennae in ♂ minutely ciliated. Palpi short, rough-scaled. Thorax hairy beneath. Femora glabrous. Fore-wings: 10 out of 9, sometimes anastomosing shortly with 9, 11 anastomosing with 10, 12 sometimes anastomosing shortly with 11.

(Plate C., fig. 53 neuration of fore-wing of *Sestra flexata*.)

An endemic genus, probably allied to *Selidosema*. We have two species.

SESTRA FLEXATA.

(*Cidaria flexata*, Walk., Cat. xxv., 1421; *Sestra humeraria*, Huds., N.Z. Moths, 89, pl. x., 1, 2 (nec. Walk.); *Sestra fusi-plagiata*, ib. xxvi., 1751; *Amastria encausta*, Meyr., Trans. N.Z. Inst. xvi., 105; *Sestra humeraria*, ib. xviii., 184.)

(Plate XVII., fig. 30 ♂, 31 ♀ pale varieties; 32 ♀ typical form, 33 ditto dark variety; Frontispiece, fig. 20 egg; Plate II., fig. 8 larva.)

This pretty species is very common, and generally distributed throughout both the North and the South Islands; it also occurs plentifully at Stewart Island, and is found on the Chatham Islands.

The expansion of the wings is from 1½ to 1¾ inches. The fore-wings are pale plum-colour; there is an indistinct, curved, brownish transverse line near the base; a straight dark brown line across the middle, and a curved series of brownish dots beyond the middle; the apex is pointed, and the termen has a strong projection a little above the middle. The hind-wings are ochreous, with a series of minute brownish dots across the middle.

This is a variable species. The fore-wings are often much clouded with rich brown, or rarely blackish-brown, and in some specimens scarcely a trace of the original purplish colour remains; the central straight transverse line is sometimes absent, and the other lines are frequently obsolete, except on the costa; the dots on the hind-wings are also often absent, and occasionally specimens are met with in which the fore-wings are very pale brownish-ochreous and the hind-wings almost white. Intermediate forms between these varieties also occur.

The egg, which is laid on its side, is cylindrical, considerably larger at the micropylar end, pale ochreous yellow, covered with numerous rows of small hexagonal depressions.

The larva, which feeds on ferns (*Histiopteris incisa* and *Pteris macilenta*) during the summer and autumn, is about 1½ inches in length when full-grown, very attenuated towards the head, and much thickened posteriorly, with a large hump on the back of segment 12; the head is small, brown, with two pale stripes; the body dull ochreous, faintly tinged with green; there is a very broad dull brown dorsal line, more or less distinctly edged with blackish; a broad pale sub-dorsal line, streaked with brown near the middle, and a broad indistinct lateral line, irregularly edged with blackish below; segments 9 to 12 inclusive have two rows of more or less distinct pale coloured warts each of which emits a short black bristle; the underside of the larva is pale yellowish, speckled with brown, and segments 6 to 10 inclusive have two central black marks.

This caterpillar is of sluggish habit, clinging firmly to the fern frond, and when disturbed coils itself up and drops to the ground where it is very hard to find.

The pupa is buried in the earth about two inches below the surface, and, in the case of autumnal larvae, the insect remains in this state during the winter months.

The perfect insect first appears about September, and continues abundant until the end of March or beginning of April. It frequents forest or scrub, and is noticed most commonly in the neighbourhood of its foodplants. There are probably several broods in the course of a year.

SESTRA HUMERARIA.

(*Macaria humeraria*, Walk., Cat. xxiii., 940; *Sestra flexata*, Huds., N.Z. Moths, 90, pl. ix., 37, nec. Walk.; *Cidaria obtusaria*, Walk., Cat. xxiii., 985; *C. obtruncata*, ib., xxv., 1421.)

(Plate XVII., fig. 28 ♂, 29 ♀.)

This species has occurred at Kao, North of Auckland, at Auckland, and in the neighbourhood of Wellington. It is probably generally distributed throughout the North Island. In the South Island it has been found at Otira, Kinloch, Lake Wakatipu and Invercargill.

The expansion of the wings is about 1½ inches. The fore-wings, which have the apex pointed but no projection on the termen, are bright orange-red; there is a very faint transverse line near the base, darker on the costa; a dark bar on the costa near the middle; and a faint transverse line beyond the middle, also darker on the costa. The hind-wings are bright ochreous-yellow, with the cilia orange.

This species varies considerably in the intensity of its colouring.

The perfect insect appears from October till December, and is found in the same localities as *S. flexata*.

Genus 3.—HYBERNIA, Latr.

Face with appressed scales. Antennae in ♂ bipectinated, apex simple. Palpi shortly rough-scaled. Thorax with small triangular anterior crest, hairy beneath. Femora glabrous. Fore-wings: 10 absent (in New Zealand species), 11 separate. Wings of ♀ rudimentary.

A genus of few species, chiefly northern-temperate; the single New Zealand species is common and widely distributed in Australia.

HYBERNIA INDOCILIS.

(*Zermizinga indocilisaria*, Walk., Cat. xxvi., 1530; *Hybernia boreophilaria*, Guen., Ent. Mo. Mag. v., 61; *Hybernia indocilis*, Meyr., Trans. N.Z. Inst. xvi., 97; Proc. Linn. Soc. N.S.W. 1891, 623.)

(Plate XVII., fig. 9 ♂, 10 ♀.)

Formerly this species occurred plentifully in the neighbourhood of Christchurch. It has since been found on the Peak Lake Coleridge, at Wedderburn Central Otago, and at Queenstown, Lake Wakatipu.

The expansion of the wings of the male is 1½ inches, of the female ½ inch. All the wings are pale grey, speckled with darker grey. The fore-wings have four obscure wavy transverse lines; the first near the base, the second and third beyond the middle, rather close together, and the fourth subterminal, much interrupted; there is a series of black dots on the termen. The hind-wings have two very faint transverse lines, and a series of black terminal dots; the termen of the hind-wings is slightly scalloped. The cilia of all the wings are grey. The female has the wings extremely small and quite useless for flight; in colour and markings they resemble those of the male, except that the transverse lines are black and sharply defined.

The perfect insect appears from July to January. According to Fereday the male was found plentifully at rest on the bare ground, amongst *Leptospermum*, and the female on the stems. A systematic examination of manuka scrub, with a lantern, on mild winter evenings, would probably often result in the discovery of this interesting species.

Described and figured from specimens from the Fereday collection.

Genus 4.—GARGAPHIA, Walk.

Face with cone of scales. Antennae in ♂ simple. Palpi rough-scaled. Fore-wings with hyaline scar on transverse vein; 10 out of 11, sometimes anastomosing shortly with 9.

(Plate C., figs. 61, 62 neurulation of *Gargaphia muriferata*.)

There are two New Zealand species, and one from Venezuela.

GARGAPHIA MURIFERATA.

(*Gargaphia muriferata*, Walk., Cat. xxvi., 1635; *Panagra ephyraria*, Walk., Cat. xxvi., 1761; ? *Zanclognatha* (?) *cookaria*, Feld., Reis. Nov. pl. exxiii., 26; *Zanclognatha* (?) *haastaria*, ib., 32; *Drepanodes muriferata*, Meyr., Trans. N.Z. Inst. xvi., 107.)

(Plate XVII., figs. 34, 35 ♂ varieties, 36 ♀; Plate II., fig. 7 larva.)

This interesting species is common and generally distributed throughout the country.

The expansion of the wings is about 1½ inches. All the wings of the male are yellowish-brown; there is a faint transverse line near the base, and a conspicuous darker transverse line running from a little before the apex of the fore-wing to the middle of the dorsum of the hind-wing; there is also a dark spot in the centre of the fore-wing, often containing one or two white dots. In the female, all the wings are slate-coloured; the transverse lines are very faintly indicated, and the central dot of the fore-wing is reddish-brown. The apex of the fore-wing in each sex is conspicuously hooked, the termen is bowed and sometimes has a very slight angle in the middle.

Both sexes of this insect are very variable. In the male, the ground colour ranges from dingy-brown to bright orange-brown; the transverse lines differ much in intensity, and in some specimens the central area of the wings enclosed by them is much darker than either the basal or the marginal portions; occasionally there is a series of black markings between the outer transverse line and the termen of the fore-wings, whilst the transverse line itself is frequently edged with a band of paler colouring. The female also varies in the ground colour and in the intensity of the transverse lines, which are sometimes marked by a few black dots.

The egg, which is laid flat, usually singly, is about one-fortieth of an inch in length, oval, symmetrical, both ends being uniform. There is no flattening above, but some eggs have a small dent. The surface is smooth, except under a high magnifier, when it is seen to be roughened by minute depressions. The colour is very pale greenish-yellow.

The larva, which feeds on *Polypodium diversifolium* is nearly 1½ inches in length, elongate cylindrical, and of almost uniform thickness; reddish-brown, with an interrupted blackish dorsal line containing five more or less distinct oblong yellowish-brown spots; there is a row of black warts around segments 2, 3 and 4 and 11 and 12, and two rows of similar warts on the other segments; each wart emits a black bristle. This larva may be found feeding on the thick-leaved parasitic fern during the summer and autumn months, the insect usually passing the winter in the pupa state.

The moth appears from September till March, and is occasionally met with in the winter. It frequents dense forests and is sometimes fairly common. The colouring of the upper and under surfaces of its wings, and the shape of the wings are both very protective, giving the insect an exact resemblance to a dead leaf. When disturbed it adds to this deception by keeping its wings quite motionless and rigidly extended, and allowing itself to fall through the air like a leaf. The resemblance in this case to the inanimate object is very perfect, and has no doubt enabled the species to escape from many enemies. It is, in fact, an extremely interesting example of the simultaneous development of structure and instinct in a useful direction, through the agency of natural selection.

This insect is much attracted both by light and by blossoms.

GARGAPHIA NEOSELENA.

(*Drepanodes neoselema*, Meyr., Sub-Antarctic Islands of N.Z. 1, 70, pl. ii., 13.)

(Plate XVII., fig. 27 ♀.)

This species was discovered in the forest at Carnley Harbour, Auckland Island, during the visit of the scientific expedition in November, 1907.

The expansion of the wings is $1\frac{1}{2}$ inches. This insect is very closely allied to *G. muriferata* from which it can be distinguished by its larger size, entire discal lunule of the fore-wings and closer approximation, on the dorsum, of the transverse lines of the fore-wings.

The perfect insect frequents the windswept rata forests on Auckland Island, where *Polypodium diversifolium* grows in extreme abundance.

Genus 5.—AZELINA, Guen.

Face with projecting hairs. Antennae in ♂ thick, simple. Palpi rather long, rough-scaled. Thorax and femora hairy beneath. Fore-wings: 10 sometimes shortly anastomosing with 9, 11 separate.

(Plate C., figs. 63, 64 neuration of *Azelina nelsonaria*.)

A South American genus of considerable extent, with which the four New Zealand species are entirely concordant; but it may be added that there are also other nearly related South American forms which show considerably diversified structure.

AZELINA VARIABILIS.

(*Polygonia variabilis*, Warren, Nov. Zool. ii., 153; *Gonophylla ophiopa*, Meyr., Trans. Ent. Soc. Lond., 1897, 387; *Azelina ophiopa*, Huds., N.Z. Moths, 93, pl. x., 26 ♂, 27, 28 ♀.)

(Plate XVII., figs. 15, 17 ♂ varieties; 16, 18 ♀ ditto; Plate II., fig. 5 larva.)

This very beautiful and variable species seems to be generally distributed throughout the North Island. In the South Island it has occurred at Motueka, near Nelson, and on the Buller River.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female about $1\frac{1}{2}$ inches. The fore-wings of the male vary from pale orange-brown to very rich orange-brown; there is a doubly toothed shaded transverse line at $\frac{1}{3}$, the teeth being marked with black dots; a conspicuous wavy transverse line runs from near the apex to the dorsum, and is also marked with several black dots; the median band is paler than the rest of the wing; there is a row of small black terminal dots, the termen has two small projections above the middle. The hind-wings are yellowish at the base, becoming orange beyond the middle; there is a faint brownish transverse line near the base, and a conspicuous wavy transverse line in the middle, marked by a series of black dots; this central transverse line divides the yellowish ground colour of the basal area, from the pinkish-orange ground colour of the rest of the wing. The female is larger and duller than the male; the fore-wings range from yellowish-drab to deep orange-brown or dark brown, with the outer transverse line dull red; there is a series of minute black dots on the termen; the hind-wings are dull orange-yellow, with a wavy central transverse line.

One very distinct variety of this species occurs in which all the wings are pale yellowish-brown, with very broad blackish transverse lines (fig. 15).

This insect is evidently closely allied to *Azelina fortinata*. It may, however be easily distinguished from that species by its broader wings and smaller terminal projections.

The eggs, which are usually deposited in January and February, are almost hemispherical, slightly ovate, flattened, pale bluish-green in colour, covered with numerous very slight hexagonal depressions. As the enclosed embryo develops, small irregular reddish-brown patches appear on the surface of the egg-shell.

The young larva, when first hatched, is about $\frac{1}{4}$ inch in length; very pale ochreous-brown, with two wavy orange-red subdorsal lines, and numerous tufts of long black bristles. The egg-shell is not eaten on emergence. The foodplants are various tree-ferns belonging to the genera *Alsophila*, *Dicksonia* and *Cyathea*.

The full-grown larva is about $1\frac{1}{2}$ inches in length and of uniform thickness throughout; the general colour is pale rusty-brown with an obscure pale-brown dorsal line, stronger on the thorax and at the commencement of each segment; there are two similar obscure lateral lines; the head is yellow, speckled with dull-red, and the entire larva is thickly covered with dark-brown dots and clothed with many very fine pale-reddish hairs; there are several obscure marks near the spiracular region, and a series of whitish tubercles on the sides of segments 5 to 12 inclusive.

This larva varies considerably in the depth of its colouring, younger specimens being always much paler than those of more mature growth. All are very protectively coloured and closely approximate to the reddish hairy midribs of the fronds of the tree-ferns on which they invariably rest. Growth proceeds slowly in the autumn, the larvae probably hibernating when they are about $\frac{1}{2}$ full size. They resume feeding about September, pupation usually taking place early in December. In captivity larvae pupate in the autumn, and the perfect insects emerge during the depth of winter.

The pupa is enclosed in a curled fern leaf or hidden amongst rubbish on the ground.

The perfect insect appears from January till April. It frequents forest, and may occasionally be dislodged from tree-ferns or undergrowth, but is more often taken on the blossoms of the white rata in the evening.

AZELINA FORTINATA.

(*Polygonia fortinata*, Gn., Ent. Mo. Mag. v., 41; *Caustoloma (?) ziczac*, Feld., Reis. Nov. pl. cxxxii., 4; *Azelina fortinata*, Meyr., Trans. N.Z. Inst. xvi., 106.)

(Plate XVII., fig. 7 ♂, 8 ♀; Plate II., fig. 13 young larva, 12 full-grown ditto.)

This striking insect occurs in forests throughout both North and South Islands. It is not, however, a very common species.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings of the male are pale orange-brown, with an extremely jagged doubly toothed black transverse line at one-third, and a wavy line at about two-thirds; between these there is a black mark on the costa and the ground colour is often paler; the termen has two large projections, and several smaller ones; there are several small black markings on the subterminal area. The hind-wings are yellowish, clouded with orange-brown towards

the termen, which also has several projections; there is a faint blackish line near the base, and a much stronger black line near the middle, starting from the dorsum and reaching about half-way across the wing. The female has the fore-wings dark purplish-brown, with the median band paler; the hind-wings are also considerably darker than those in the male.

This species varies a little in the depth of the ground colour.

The young larva, immediately after first moult, is about $\frac{1}{2}$ inch in length, dull ochreous with a conspicuous blackish dorsal line and three or four fine, bright red, lateral lines, another blackish line being situated below the spiracles; the head is pale ochreous dotted with black, and the entire larva is clothed with rather long black hairs. It feeds on *Polystichum vestitum*, and when resting on the hairy under side of the fronds of this fern it is extremely hard to see. The full-grown larva is from $\frac{1}{4}$ to $\frac{1}{2}$ inches in length, rather elongate, slightly thickened posteriorly, pale brownish ochreous, sometimes slightly tinged with green and speckled with reddish-brown, especially towards the extremities; there is a very broad brownish band on the back edged with blackish; this band is very faintly indicated on segments 2, 3 and 4, and its edges marked by blackish dots only on segments 10, 11 and 12; segment 12 is humped, with a strong oblique lateral stripe; there are conspicuous slightly oblique black markings on the sides of segments 6, 7, 8 and 9 and a black and whitish lateral line on segments 2, 3 and 4; the whole larva is densely covered with very fine blackish hairs. There is considerable variation in the depth of the colouring, some individuals being much paler than others.

The pupa is enclosed in a light cocoon, constructed of the brown hairy scales of the fern. It is usually affixed to the underside of one of the fronds.

The perfect insect appears from December till March, and is found in forests. It generally occurs wherever its foodplant is abundant from which it can often be dislodged. It is fairly common in many of the densely wooded valleys on the West Coast of the South Island, and has a distinct predilection for localities having a heavy rainfall.

AZELINA GALLARIA.

(*Selenia gallaria*, Walk., Cat. xx., 185; Butl., Cat. N.Z. Lep. pl. iii., 6, 7; *Euchlaena* (?) *palthidata*, Feld., Reis. Nov. pl. cxxxii., 21, 22; *Ischalis thermochromata*, Walk., Cat. xxvi., 1750; *Stratocleis gallaria*, Meyr., Trans. N.Z. Inst. xvi., 105; *Azelina gallaria*, ib. xx., 62.)

(Plate XVIII., figs. 1-4 ♂ varieties; 5, 6 ♀ ditto; Plate II., fig. 6 larva.)

This extremely variable species has occurred at Kaco (North Auckland), Whangarei, Thames, Ohakune, Puketiriri, near Napier, Makotuku, Palmerston North and Wellington in the North Island. In the South Island it has been found at Christchurch and Dunedin. It also occurs on Stewart Island.

The expansion of the wings of the male is $\frac{1}{4}$ inches; of the female $\frac{1}{2}$ inches. The fore-wings of the male vary from pale yellowish-brown to bright orange-brown, or reddish-brown; there is a wavy transverse line about $\frac{1}{3}$, often obsolete except on the costa; another wavy transverse line beyond the middle, also frequently obsolete except on the costa; followed by a very conspicuous straight line, often double, running obliquely from a little before the apex to the dorsum; outside this line, near the

tornus, there are, in most specimens, two black spots or one large rust-red spot; the termen has two projections near the apex, inside which there is usually a darker blotch. The hind-wings are as variable in colour as the fore-wings; there is one wavy line near the base, followed by an almost straight line, which is a continuation of the straight line of the fore-wing; beyond this line the ground colour is generally much darker and is often purplish-tinged; the termen itself has no projections. The female has broader wings and a shorter body than the male; the ground colour and markings are similar to those of the male, but are usually more sombre and more strongly tinged with purple; the termen of both fore- and hind-wings, has a number of prominent projections. The under side of the wings in both sexes is beautifully marbled with yellow and reddish-brown, and several of the markings of the upper surface are faintly indicated.

This species, as will be seen from the foregoing, is so extremely variable that a more detailed description would be useless, especially as the straight, oblique, transverse lines of both fore- and hind-wings together with the insect's smaller size, will distinguish it from the other members of the genus. Some very striking forms (figs. 3 and 5) occur, in both sexes, where the ground colour of the median band of the fore-wings is very much paler than the deep brown basal and terminal areas and in these the terminal area of the hind-wings is also dark brown. As a rule, however, the ground colouring is fairly uniform, the only markings consisting of the transverse lines and blotches already described.

The egg is hemispherical, considerably flattened above, pale straw-colour, covered with numerous minute depressions.

The young larva, which does not eat the egg-shell on emergence, is about $\frac{1}{2}$ inch in length, reddish ochreous with a very broad crimson line on each side; there are numerous large greenish-black warts, each wart emitting several long black bristles. The full-grown larva is about $\frac{1}{4}$ inches in length, rather slender, cylindrical, with a strong hump on the back of segment 12, its colour varies from pale dull olive-green to dull blackish-red; there is usually an interrupted dorsal stripe, often containing fainter spots and frequently indistinct, except at the segmental divisions, as well as a series of more or less indefinite lateral stripes; the surface of the larva is much wrinkled and covered with very fine black down; there are also numerous minute brown and whitish-grey dots which make all the markings very indefinite; an irregular series of yellow tubercles is situated on the lateral line.

This larva feeds during the autumn and winter on *Dryopteris pennigera*, a fern which grows very commonly on the banks of streams in dense forests. When young, it rests on the edges of the fern fronds, where it is extremely difficult to see, but older larvae usually cling to the midrib.

The pupa is enclosed in a light cocoon formed by fastening two of the side fronds together with silk, the insect passing the rest of the winter in this condition.

The moth appears from November till March. It frequents dense forest, and is most abundant at the flowers of the white rata in the evening. Earlier in the year, before the rata blooms, it may sometimes be taken at sugar. Like *Gargaphia muriferata* this insect falls like a dead leaf, the wings being held motionless and the moth falling slowly through the air and coming to rest on the ground

without a movement. One specimen experimented upon fell in this way a distance of four feet, on three successive occasions, and in each case considerable difficulty was experienced in finding the insect amongst the dead leaves on the ground.

AZELINA NELSONARIA.

(*Gonodontis nelsonaria*, Feld., Reis. Nov. pl. cxxiii. 3; *Gonodontis felix*, Butl., Proc. Zool. Soc. Lond. 1877, 389, pl. xlii, 10; *Phyllodoce nelsonaria*, Meyr., Trans. N.Z. Inst., xvi, 104; *Gonophylla nelsonaria*, ib. xviii., 184.)

(Plate XVIII., fig. 7 ♂, 8 ♀.)

This very handsome insect has occurred at Thames, Wairakei, Waimarino, Puketiritiri (Napier), Mount Egmont and Wellington in the North Island, and at Nelson, Bealey River, Dunedin and Sandhill Point (Preservation Inlet) in the South Island.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female $1\frac{3}{4}$ inches. The fore-wings of the male are rich reddish-brown, mottled with darker; there are several small white marks on the costa; a black discal dot, and an almost straight white transverse line beyond three-quarters; outside this line the wing is speckled with greyish-white. The hind-wings are pale pinkish-brown or purplish-brown; there is a black discal dot, and a curved wavy blackish transverse line a little beyond the middle, being a continuation of the transverse line of the fore-wing; beyond this line and on the dorsum, there are generally several small blackish markings. The female has the fore-wings orange-red, speckled with darker; there is a doubly curved wavy transverse line at about $\frac{1}{2}$, and an almost straight transverse line beyond $\frac{3}{4}$, both dark red. The hind-wings are pale reddish-orange, often tinged with purple with a curved wavy blackish transverse line. In both sexes the apex of the fore-wing is projecting, and there is a strong rounded projection on the termen a little above the middle; the termen of the hind-wing also has several small projections.

The variation of this insect is considerable, especially in the male. The ground colour of the fore-wings often inclines to dull brown, or dull yellowish-brown; the light and dark mottling, and the greyish markings near the termen are sometimes hardly visible; there is often a whitish blotch opposite the large projection in the termen of the fore-wing. The hind-wings also are very variable in their colouring. All these varieties exist in the female in a less pronounced degree.

The perfect insect appears during the first week in February, and is generally over by the middle or end of March. It frequents forests. The males are first noticed, the females not appearing until about a fortnight later. I have never taken this insect in the daytime, and in fact have never seen it except on the blossoms of the white rata, where, on fine evenings, it is sometimes abundant.

Genus 6.—DECLANA, Walk.

Face rough. Antennae in ♂ usually bipectinated, sometimes simple. Palpi rather long, second joint ascending, with long hairs beneath terminal joint long, slender, clavate, porrected. Thorax densely hairy above and beneath, with more or less developed median crest. Femora densely hairy. Fore-wings

with raised scales; 10 sometimes out of 9 usually anastomosing with 9, 11 seldom out of 10, sometimes anastomosing with 10. (Plate C., figs. 56, 57 neurulation of *Declana floccosa*; fig. 58 head of ditto.)

Well characterized by the peculiar palpi. Of this very interesting endemic genus, we have no less than ten species, several of which are extremely handsome. One is confined to the North Island, three to the South Island, and six are common to both islands.

Section A.—Antennae in male simple.

DECLANA LEPTOMERA.

(*Ipana leptomera*, Walk., Cat. xv., 1662; *Amphitape crassitibia*, Feld., Reis. Nov. pl. cix., 10.)

(Plate XVIII., figs. 35, 36 ♂ varieties; 37 ♀ ditto; Plate II., fig. 21 larva.)

This narrow-winged species is common in the Wellington district. It has also occurred at Kaeo (North Auckland), Whangarei, Nelson, Buller River, Christchurch, and Invercargill.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings of the male are uniform pale brownish-ochreous, generally with two transverse series of minute darker brown dots parallel to the termen, and two or three similar dots near the middle of the wing. There is a series of very small brown lines on the costa. The hind-wings are greyish-brown with two very deep indentations in the termen. The female has the fore-wings pale grey, and, the hind-wings darker grey; the markings and outline resemble the male.

Some male specimens have four large black spots on the fore-wings, two near the base, and two near the termen. These spots are occasionally joined together by a very broad black band, which extends along the whole of the central portion of the fore-wings. Other male specimens have the fore-wings entirely marbled with dark grey. In the female two or three moderately large spots are occasionally present on the fore-wings, near the termen. All these varieties are much scarcer than the typical form. In the extreme south the males are often clouded with dark brown.

The egg is irregularly oval, sunken on the sides, and with no visible sculpture, except a slight pitting. It is pale green when first laid, but rapidly changes to yellowish-brown. The young larva is very slender, pale ochreous, with a series of conspicuous broad red lines on the segmental divisions, which are also armed with numerous short black bristles; the anterior and posterior portions of the larva are, in fact, nearly covered with red lines and black bristles. The foodplant is manuka (*Leptospermum*).

The length of the full-grown larva is nearly two inches; it is elongate, cylindrical, becoming gradually stouter towards the posterior extremity; the head is very flat; the legs rather stout, and the prolegs large and strong; there is a prominent lateral ridge produced into small excrescences on segments 6, 7, 8, and 9; the general colour is pale brown; there is a broad dorsal band formed of dark greyish-brown streaks; a dark lateral shading on segments 7, 8 and 9, also on prolegs, and a few brighter brown streaks on parts of the body.

The larva is coloured so that it harmonises very perfectly with the bark of the manuka. It is of sluggish habits by day, and is usually seen sticking straight out, in a position exactly resembling a twig.

The pupa is enclosed in cocoon of silk and refuse on the surface of the ground.

The perfect insect appears in January, February and March. It is a forest-dwelling species, and may often be captured in some numbers, at dusk, on the flowers of the white rata (*M. scandens*). It is very sluggish and, when disturbed, nearly always drops to the ground and feigns death.

DECLANA NIVEATA.

(*Declana niveata*, Butl., Cist. Ent. ii. 500. *Atossa niveata*, Meyr., Trans. N.Z. Inst. xvi., 104.)

(Plate XVIII., fig. 19 ♂.)

This delicate-looking species has occurred at Kaitoke, near Wellington, in the North Island, and at Temuka, Dunedin, Lake Wakatipu and Invercargill in the South Island.

The expansion of the wings is $1\frac{1}{4}$ inches. The antennae of the male are slightly dentate. The fore-wings are greyish-white, sometimes very slightly tinged with ochreous; the first, second and subterminal lines are faintly indicated in darker grey, and there is often an ill-defined median shade and a darker mottling on the subterminal area. The hind-wings are snow-white.

The larva feeds on *Rubus australis*.*

This species is very similar in general appearance to *Declana floccosa*. It may, however, be easily separated from any of the varieties of that insect, by its slightly smaller size, absence of distinct pectinations in the antennae of the male, and snow-white hind-wings.

The perfect insect appears from September till March, and frequents forests.

Section B.—Antennae in male bipectinated.

DECLANA GRISEATA.

(*Declana griseata*, Huds., N.Z. Moths, 98, pl. x., 32.)

(Plate XVIII., fig. 15 ♂, 16 ♀.)

This rather dull-looking species has occurred in the South Island at Waiho Gorge, Dunedin, Lake Wakatipu, Invercargill and Orepuki.

The expansion of the wings is from $1\frac{1}{4}$ to $1\frac{3}{4}$ inches. The fore-wings are dull slaty-grey, with a paler band at about $\frac{1}{3}$; there is a fine oblique wavy transverse line at about one-fourth, another at about one-half, and indications of a third at about three-fourths; numerous minute black streaks are thickly scattered over the wing, especially near the base and the termen; the termen itself is very slightly waved. The hind-wings are pale grey, darker near the termen. The body is very dark slaty-grey.

The perfect insect appears from September till May, and is attracted by light. It is a very scarce species.

*Trans. N.Z. Inst., xlix., 214.

DECLANA FLOCCOSA.

(*Declana floccosa*, Walk. Cat. xv., 1649. *Argua scabra*, Walk. Cat. xxviii., 448. *Declana nigrosparsa*, Butl., Cist. Ent. ii., 500. *Declana floccosa*, Meyr., Trans. N.Z. Inst. xvi., 102.)

(Plate XVIII., figs. 23-29 ♂ varieties; 30-34 ♀ ditto;

Frontispiece, fig. 17 egg.)

This pretty species is very common and generally distributed throughout the country.

The expansion of the wings is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. The fore-wings are pale greyish-white, or pale ochreous brown, with numerous small dark brown or grey streaks, often exhibiting a slight concentration near the apex. The hind-wings are whitish-grey or pale brownish-ochreous, darker towards the termen (figs. 28 male, 31 female typical form).

This insect is so extremely variable that I have given very brief descriptions of a few of the principal varieties below; all these forms may, however, be connected by specimens exhibiting every intermediate gradation both in colour and in markings, and in many cases the peculiarities of two or more varieties are combined in one individual.

1. Fore-wings with several large brown spots near the middle (fig. 24).
2. Fore-wings covered with numerous small black spots formerly known as *Declana nigrosparsa* (figs. 32, 33).
3. Fore-wings with two more or less conspicuous curved black, brown, or yellowish-red transverse lines (figs. 23, 27 and 29).
4. Fore-wings with these transverse lines joined by two others running parallel to dorsum and costa. An extreme form of this variety has all the veins marked in black (figs. 27 and 30).
5. Fore-wings with transverse lines and black spots.
6. Fore-wings diffused with dark greyish-black, except two broad bands of the original light colour extending from costa to dorsum; hind-wings darker than usual (fig. 25).
7. Fore-wings with dark median band. (Fig. 26).

All these varieties occasionally have tufts of orange-yellow scales on both the wings and on the body, and they also vary in other minor particulars.

The egg of this insect, which is laid upright, is oval, slightly smaller at one end, covered with numerous very minute depressions, and bronzy-green in colour.

The young larva is very attenuated with only ten legs. Its colour is pale yellow striped with brownish-pink near the segmental divisions. It is very active, and does not devour the egg-shell after emergence.

The full-grown larva has the body much flattened underneath. In colour it is pale brownish-pink, with numerous irregular darker markings, which in some specimens almost form two broad sub-dorsal lines. The under surface of the larva is pale green. There is a series of fleshy filaments of a pinkish-brown colour along each side of the insect, and a pair of prolegs on the ninth segment.

This caterpillar is, however, very variable, its colouring appearing to depend to some extent on its surroundings. The favourite foodplants are *Leptospermum ericoides* and *Aristotelia racemosa*. The larvae found on the former plant are usually pale yellowish-brown, whilst those from the latter are much darker brown, often mottled with grey like the stems of the *Aristotelia*. A specimen I once found feeding on a mountain beech (*Nothofagus cliffortioides*),

the gnarled stem and branches of which were covered with grey lichens and mosses was mottled with the most beautiful shades of greenish-grey. Other foodplants are tawa (*Beilschmiedia tawa*), tutu (*Coriaria*), and *Cupressus macrocarpa*.

During the day this larva rests quietly attached to the stem of its foodplant, where it is very difficult to detect, as the filaments so closely embrace the twig or tree-trunk that the whole insect exactly resembles a swelling in the bark.

The pupa is enclosed in a loose cocoon on the surface of the ground.

The perfect insect appears about September, and continues in more or less abundance until the end of April. There are most likely several broods in a season, and, as we frequently meet with specimens of the moth on mild days in the middle of winter, it evidently hibernates.

This insect is usually observed at rest on fences and tree-trunks, where its grey mottled colouring causes it to closely resemble a patch of lichen.

Owing to its extreme variability, in both the larval and imago states, this species would form an excellent subject for experiments in heredity.

DECLANA FEREDAYI.

(*Declana feredayi*, Butl. Proc. Zool. Soc. Lond., 1877, 398, pl. xliii. 5; *Declana sinuosa*, Philp., Trans. N.Z. Inst., xlvii., 197.)

(Plate XVIII., figs. 20, 21 ♂ varieties; 22 ♀.)

This species, which is extremely closely allied to *Declana floccosa*, was rediscovered by the late Mr. M. O. Pasco on Ben Lomond, Lake Wakatipu, at an elevation of about 3,000 feet above the sea-level. Mr. Philpott has also taken it on Mount Cleughearn at the same altitude, and Mr. Grimmer on Mount Arthur (Nelson). I also detected it on Mount Ruapehu in the North Island, and it has been found by Dr. Myers at York Bay, Wellington Harbour.

The expansion of the wings is about 1½ inches. It differs from *Declana floccosa* in the following respects: The thorax in the male has a median crest, usually of darker colour than the rest of the body, and a slight crest is present in the female; the minute stripes on the costa are longer; the first line is further from the base, slightly inwardly oblique and almost straight, the second line is indented above and below the middle and the costal edge is strongly arched at the base and widely sinuate to the apex.

There is great variation and dark grey, or grey and rusty-reddish forms, are not infrequently met with.

The perfect insect appears from October till February, and may be looked for in sub-alpine forests.

DECLANA HERMIONE.

(*Declana hermione*, Huds., N.Z. Moths, 98, pl. x., 36.)

(Plate XVII., fig. 19 ♂.)

This interesting species has been taken at Wellington, Lake Wakatipu, Orepuki and Invercargill.

The expansion of the wings is 1½ inches. The fore-wings are light purplish-brown, clouded with silvery-white towards the middle and on the termen; there is a very fine oblique chocolate-brown mark at the base, a broad broken transverse band at about one-eighth; a fine curved, slightly waved transverse line at about three-fourths, shaded towards the termen; there are four wavy brown marks on the termen inclining obliquely upwards towards the costa; the termen itself is narrowly edged with chocolate-brown. The cilia are silvery mixed with brown; the termen is very strongly bowed. The hind-wings are grey, shaded with purplish-grey towards the termen; the cilia are grey.

The perfect insect appears from October till March, and is attracted by sugar and light. It is a very rare species, although apparently commoner at Orepuki than elsewhere.

DECLANA JUNCTILINEA.

(*Declana junctilinea*, Walk., Cat. xxxii., 643; *Chlenius verrucosa*, Feld., Reis. Nov. pl. cxxxi., 22.)

(Plate XVIII., figs. 11 ♂, 12 ♀ North Island form; 13 ♂, 14 ♀ South Island form; Plate II., fig. 27 larva.)

This species has occurred occasionally at Wellington, in the Botanical Gardens. It is plentiful on the lower slopes of Mount Egmont, and has also been found at Blenheim, Nelson, Paradise at the head of Lake Wakatipu, and in the Invercargill District.

The expansion of the wings is about 1½ inches. The fore-wings of the male are pale brown, with two indistinct, irregular, transverse darker lines near the base, a conspicuous curved line a little beyond the middle, followed by a blackish patch; there is a series of very fine parallel oblique brown stripes on the costa, several series of curved, blackish marks near the termen, and on the central portions of the wing, and a conspicuous, irregular white streak from the apex towards the dorsum. The fore-wings of the female are much greyer, the central portions of the wing are white, and, with the exception of the fine, oblique costal stripes and apical streak, the other markings of the male are usually absent. The hind-wings of both sexes are dull ochreous. The strongly pectinated antennae of the male, and the oblique costal markings of both sexes, will at once distinguish this species from any of the varieties of *Declana floccosa*.

There is considerable variation in the shape of the second line on the fore-wings of the male, and in the depth of the colouring in both sexes. South Island specimens are slightly larger, and the males generally much darker, than those from the North Island. In these males the first and second lines on the fore-wings are broadly shaded with dark brown, and the entire wing more or less sprinkled with blackish-grey marks. The terminal half of the hind-wings is clouded with dark grey. The South Island female has the fore-wings more or less clouded with grey and the hind-wings white with a faint grey terminal shading.

The egg closely resembles that of *Declana floccosa*.

The young larva when first excluded from the egg is about three-sixteenths of an inch long, dark brownish-red with a very broad creamy-white lateral line and a few scattered black bristles.

The length of the full-grown larva is about 2 inches. It is cylindrical, tapering towards the head, which has two blunt

protuberances on the vertex; there is a very large irregular pointed protuberance on each side of the 6th segment and a much smaller double protuberance on the back of the 12th segment; the general colour is dull brown with wavy darker subdorsal and lateral lines and many finer marks and irregularities, causing the surface of the larva to exactly resemble bark; there is an irregular lateral ridge.

This larva remains motionless and rigidly extended from a twig of its foodplant and in this way almost defies detection. It feeds intermittently on manuka (*Leptospermum*) during the whole of the winter.

The pupa is enclosed in a very open cocoon constructed of silk and refuse amongst the twigs of the foodplant.

The perfect insect appears from November till March. It is attracted by blossoms, sugar and light, but is not generally a common species..

DECLANA GLACIALIS.

(*Declana glacialis*, Huds., Trans. N.Z. Inst., xxxv., 245, pl. xxx., 2 ♂.)

(Plate XVIII., fig. 9 ♂, 10 ♀.)

This very brightly-coloured species was discovered by Mr. C. W. Palmer on the Tableland of Mount Arthur, at an elevation of about 4,000 feet above the sea-level. It has also occurred on Arthur's Pass, on the Sealey Range, near Mount Cook, on Ben Lomond, Lake Wakatipu, and on the Hunter Mountains.

The expansion of the wings of the male is almost 1½ inches; of the female fully 1½ inches. The fore-wings of the male are very dark rich purplish-brown; there is a large, very irregular, deeply indented white mark in the middle of the wing extending from the base beyond ¾; this marking is almost bisected by a bright reddish-brown longitudinal streak; there is an obscure bluish-white mottling on the subterminal area and the veins are bright reddish-brown; the apex of the fore-wings is rather prominent and the termen somewhat bowed. The hind-wings are bright-orange, with a dark brown terminal band, narrowest near the dorsum; the cilia are bright-orange. The head and thorax are covered with orange-brown hair; there is a conspicuous ochreous band on the prothorax, and the abdomen is dull-orange, speckled with black towards the tip.

In the female all the wings are considerably narrower and the white markings on the fore-wings very much more extensive than in the male. The hind-wings are pale orange-ochreous with grey median and subterminal lines, and a greyish-brown terminal band.

The perfect insect appears from November till January. It flies with great rapidity in the sunshine, but is most abundant in the late afternoon. It may be looked for on open mountainous country, at elevations between 2,000 and 4,000 feet above the sea-level. It seems to be fairly common on Arthur's Pass, where specimens may sometimes be captured as they dash across the old coach road. The female is much rarer and less active than the male. The peculiar habits of this insect have already been referred to in Chapter III.

DECLANA ATRONIVEA.

(*Detunda atronivea*, Walk., Cat. xxxii., 619; *Chlenias* (?) *manxifera*, Fereday, Trans. N.Z. Inst., xii., 268, pl. ix. 1; *Detunda atronivea*, Meyr., ib. xvi. 101.)

(Plate XVIII., fig. 18 ♀.)

This very handsome insect appears to be restricted to the North Island where it is generally rather rare. It is, however, abundant on the lower slopes of Mount Egmont, and has occurred occasionally at Thames, Waitomo, Waimarino, Taumarunui, Ohakune, Hawera, Napier, Otaki and Wellington.

The expansion of the wings of the male is 1½ inches, of the female nearly 2 inches. The fore-wings are brilliant shining white, with numerous black markings; these consist chiefly of three irregular branching transverse bands, and a series of wedge-shaped spots on the termen; the larger markings are brownish in the centre. The hind-wings are dark grey, becoming almost black on the termen, with a fine wavy transverse black line.

This species varies considerably in the size and shape of the black markings on the fore-wings, which are often slightly different on the opposite sides, in the same specimen.

The eggs of this moth are about one thirty-second of an inch in length, oval, slightly roughened on the surface and light blue in colour. They are deposited towards the end of October. The young larva escapes by gnawing a hole out of the side.

When first hatched it is dull brownish-black, with creamy-white lateral lines and prolegs; the head is reddish. It feeds on *Nothopanax arboreum*. After the first moult the lateral lines become much wider, especially towards the head. After the second moult the two dorsal tubercles are fully developed, the thoracic segments much swollen and flattened above, the latter bearing traces of the black markings of the full-grown larva. After the third moult the larva becomes a dark brownish colour inclining to chocolate on the dorsal surface. The characteristic markings on the penultimate and anal segments of the adult larva now appear, and the dorsal tubercles are yellowish in colour; the extra prolegs are very small, and are visible as wart-like appendages on the lower surface of the tenth segment.

The full-grown caterpillar is a remarkable-looking animal. The head is very small; segments 2, 3 and 4 are enormously swollen and flattened above, the flattened portions being white, with several small black ring-shaped markings; there is a pair of large yellowish tubercles on the dorsal surface of the seventh segment, and two smaller ones on the tenth and eleventh segments; the larva is much stouter towards the posterior extremity, especially behind the ninth segment; the penultimate segment is furnished with a large creamy-white ridge, starting on the back and proceeding downwards and forwards; the extra pair of prolegs is small and only occasionally used in walking. The general colour of the larva is brownish- or blackish-green; the tenth and eleventh segments are generally

darker, and there are many fine parallel lines of darker colouring on the central portions of the larva; the whole insect is also speckled with black; the spiracles are red. The larva varies a good deal in colour, but, with the exception of the next species, its peculiar structure will at once distinguish it from any other.

These larvae often coil themselves up when at rest, clinging firmly with their large prolegs to their foodplant. Whilst thus engaged they have a very remarkable appearance. I have not yet ascertained the precise object of the peculiar shape and coloration of this caterpillar. It appears to resemble very closely a lichen-covered twig, but I suspect in this case there is something more special aimed at.

In connection with this subject, it is noteworthy that the flattened extremities of the elytra of the beetle, *Ectopsis ferrugalis*, closely resemble in both shape and colour the remarkable anterior segments of the larva of *D. atronivea*. As both insects feed on the same plant, and thus exist under very similar conditions, it is highly probable that the peculiarities have been independently acquired in each species for similar purposes.

The pupa is enclosed in a light cocoon amongst dead leaves, etc., on the surface of the ground.

The perfect insect appears from October till March, and is usually taken at blossoms in the evening. It is also attracted by light, and has been found occasionally, in the daytime, resting on tree-trunks. It hibernates during the winter, coming abroad again the following spring to lay its eggs. I have observed that a good many pupae from the autumnal brood do not emerge until September or October, so that the insect evidently spends the winter both as a pupa and as an imago. The value of the strongly contrasted colouring of this species for protective purposes has already been referred to in Chapter IV.

DECLANA EGREGIA.

(*Chlenias egregia*, Feld. Reis. Nov. pl. cxxxi. 24; Fereday, Trans. N.Z. Inst. xii. 268, pl. ix. 2. *Detunda egregia*, Meyr., ib. xvi. 101.)

(Plate XVIII., fig. 17 ♂.)

This very handsome insect has occurred in the South Island at Nelson, Christchurch, Akaroa, the Otira Gorge, Waiho Gorge, Dunedin, Invercargill, Orepuke and Stewart Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. The forewings are creamy-white; there is a small dark brown mark at the base, a broad oblique transverse dark brown band at about $\frac{1}{2}$, a very large four-cornered irregular dark chocolate-brown mark beyond the middle, one of its corners touching the apex and the other the tornus; the termen is shaded with pale grey, and there is a series of faint brown marks on the costa and dorsum. The hind-wings are pale brownish-grey, darker towards the termen; there are two very faint transverse lines.

The larva, which evidently closely resembles that of *Declana atronivea*, was discovered by Miss Edith Howes at Stewart Island feeding on *Nothopanax*. It is thus described by Mr. Philpott:—

When fullgrown the larva is about $1\frac{1}{2}$ inches in length and is stoutly built, the body being rugose and irregular. There are two pairs of prolegs, and the anal claspers are broad and flat. The colour is pale ochreous-brown mixed with dark brown on ventral surface and thorax; head faintly greenish; second thoracic segment much swollen dorsally, pale pink; a double transverse row of 4 black dots on median area, the first row hidden by fold except when the head is much depressed, a number of black dots and markings on anterior area; dorsal line pale, dark-margined, interrupted; sub-dorsal darker, black-margined; lateral indistinct; spiracles yellowish-red. Segments 9, 10, and 11 almost wholly dark brown marked off from pale posterior segments by oblique black margin; on segments 6 and 9 a prominent pale dorsal ridge. The young stages are darker in colour. Pupation took place under fragments of dead leaves loosely bound together with a few threads of silk.

The pupa is elongate slightly under 1 inch in length, dark red-brown. The appearance of this curious larva is probably of intimidative value. Though generally twig-like in form, the swollen pink thorax is very striking and noticeable. When the larva is disturbed the head is depressed, the spotted dorsal area is brought into view, and the creature sways several times to and fro. Further careful observations and experiments on this interesting larva are much needed.*

The perfect insect appears from November till February, and is probably generally distributed in forest districts in the far south, but not anywhere common. It seems to be most plentiful on Stewart Island and in the extreme south-west of the South Island. It is attracted by light.

*Trans. N.Z. Inst. xlix., 213.

CHAPTER XI.

THE PYRALIDAE.

The *Pyralidae* may be distinguished by the following characters:—

The maxillary palpi are developed. The fore-wings with vein 1b usually simple, sometimes shortly furcate at base, 1c sometimes present, 5 rising below middle of transverse vein, usually approximated to 4, 8 and 9 stalked, 11 from beyond middle of cell. Hind-wings with frenulum, 1c present, 8 rising free approximated or anastomosing with 7 beyond cell, thence diverging. (See Plate D.)

The insects which are comprised in this large family are usually remarkable for their slender build, and relatively long and thin legs; the fore-wings are more or less elongate-triangular, sometimes extremely elongate and narrow; the hind-wings usually relatively broad, ovate. In respect of the typical markings the fore-wings usually have three transverse lines, viz. first, second, and subterminal, and three small spots in the disc, viz. a dot-like ante median called the orbicular, a similar one beneath it called the claviform, but very seldom perceptible, and a post median (variably 8-shaped, transverse linear, or dot-like) called the discal spot or mark. The hind-wings have a discal spot and similar lines, but the first line is usually absent and all the markings very often obsolete.

The larva is more or less elongate with 10 prolegs, usually with few hairs. Pupa with segments 9-11 free; not protruded from cocoon in emergence.

The representation of this family in New Zealand presents the same features as that of the *Noctuidae*, but in a still more exaggerated form. The family contains about ten sub-families, and a vast number of genera and species, being most largely developed in tropical regions; but in New Zealand most of the principal divisions are either absent or barely represented by a very few stragglers or immigrants, whilst at the same time the groups of *Crambus* and *Scoparia* are so disproportionately developed that the *Pyralidae* as a whole form almost 18 per cent. of the entire lepidopterous fauna.

The geographical origin of these numerous developed sections is undoubtedly to be traced to South America. This is remarkably borne out by the curious circumstance that *Crambus* is virtually absent from the Australasian region, though otherwise cosmopolitan and dominant, and therefore could only have entered from the south. It is probable that *Crambus* and *Scoparia*, which are tolerant of cold climates, and feed in the larval state on grasses and moss, attained considerable development in an antarctic continent under conditions similar to those now prevailing

in the Falkland Islands (which seem to be actually a remnant of such a continent, and should exhibit a similar lepidopterous fauna), the remnants of this fauna being now isolated in a few last refuges, of which New Zealand is the chief.

The fragmentary and scantily developed portion of the fauna represents the results of accidental wind-borne immigration over a wide sea, and might reasonably have been expected to be larger than it is, for many of the Pyrales are great travellers; perhaps in no other group are there so many species of very wide distribution. Many species range through most of Asia, Africa, Australia, and the Pacific islands, and yet have failed to reach New Zealand. (Meyrick.)

The *Pyralidae* are represented in New Zealand by the five following sub-families:—

- | | |
|-----------------|-----------------|
| 1. PHYCITIDES. | 4. PYRAUSTIDES. |
| 2. GALLERIADES. | 5. PYRALIDES. |
| 3. CRAMBIDES. | |

Sub-family 1.—PHYCITIDES.

Maxillary palpi not triangular. Fore-wings with vein 7 absent. Hind-wings with defined pecten of hairs on lower margin of cell.

A very large and highly developed sub-family of recent origin, barely represented in New Zealand; it is not improbable that none of the species are truly indigenous.

Six genera occur in New Zealand.

- | | |
|------------------|----------------|
| 1. SPOROPHYLA. | 4. EPHESTIA. |
| 2. CROCYPDOPORA. | 5. HOMOEOSOMA. |
| 3. PLODIA. | 6. DELOGENES. |

Genus 1.—SPOROPHYLA, Meyr.

Tongue developed. Antennae in ♂ simple, shortly ciliated. Labial palpi moderately long, obliquely ascending, second joint much thickened with dense scales, terminal joint short, obtuse. Maxillary palpi rudimentary. Fore-wings with 4 absent, 3 and 5 connate, 8 and 9 stalked. Hind-wings with 2 almost from angle, 4 absent, 3 and 5 stalked, 6 and 7 connate, 8 closely approximated to cell and anterior portion of 7. (Plate D, fig. 1, 2, 3, neuration and head of *Sporophylla oenospora*.*)

The single species is apparently endemic, but I think it may prove to be derived from Tasmania. The genus is nearly allied to the following.

*The upper portion of the transverse vein of the hind-wings is so indistinct that the origin of vein 6 cannot be definitely determined.

SPOROPHYLA OENOSPORA.

(*Crocypodora oenospora*, Meyr., Trans. Ent. Soc. Lond., 1897, 388.)

(Plate XIX., fig. 1, ♂.)

This species has occurred at Ida Valley, Pembroke (Lake Wanaka), Alexandra and Ben Lomond (Lake Wakatipu). It seems to be rather local.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate, narrow, with the termen very oblique, dull brown, more or less clouded with grey and often tinged with reddish-brown near the middle; the first line is black, very broad, oblique, only reaching half way from dorsum to costa; the reniform is obscure, dull white; the second line is broad and black on the costa, indefinitely edged with dull white towards the termen, and not reaching dorsum. The hind-wings are dark brown. The cilia of all the wings are brown.

The female is usually much greyer than the male with the markings less definite. Both sexes are rather variable, some specimens being considerably darker and browner than others.

The perfect insect appears from November till April, and usually frequents rather open situations.

Genus 2.—CROCYPODORA, Meyr.

Tongue developed. Antennae in ♂ ciliated, with large tuft of scales in a situation at base. Labial palpi long, stout, densely scaled, porrected, terminal joint short, obtuse. Maxillary palpi rudimentary. Fore-wings with 4 absent, 8 and 9 stalked. Hind-wings with 2 almost from angle, 4 absent, 3 and 5 stalked, 6 and 7 stalked, 8 closely approximated to cell and anterior portion of 7.

Includes only the following species, which is doubtless of Australian origin, and probably recently introduced into New Zealand.

CROCYPODORA CINIGERELLA.

(*Nephoteryx cinigerella*, Walk., Cat. xxxv., 1719; *N. stenoptercella*, Meyr., "Proc. Linn. Soc. N.S.W.," 1878, 200; Trans. N.Z. Inst., xx., 72.)

(Plate XIX., fig. 2.)

This rather inconspicuous insect has occurred at Whangarei, Lake Taupo and at Nelson.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are dark grey, slightly speckled with dull white, with very indistinct markings; the first line is rather oblique preceded on the dorsum by a rather large dull reddish-grey spot; there are two blackish marks placed transversely on the disc of the wing beyond the middle, followed by very faint traces of the second line and several very obscure blackish marks near the termen. The hind-wings are greyish-ochreous.

The perfect insect appears in December, January and February. It is very local and seems to be taken only at light. In 1887 Mr. Meyrick wrote of this insect as follows: "This species is very common in East and South Australia, frequenting dry, usually sandy, places, and coming freely to lamps. I have long been familiar with it there, but never took it in New Zealand until the summer of 1885-1886, nor have I seen it in other collections; it is therefore possible that it may be a recent accidental introduction; if so, it will probably be found soon to become more common

and generally distributed. But in any case it is to be considered as a strictly Australian insect, which has incidentally found its way to this country."^{*}

Genus 3.—PLODIA, Guen.

Face with conical projection of scales. Antennae in male shortly ciliated. Labial palpi moderately long, porrected with appressed scales, terminal joint rather short, pointed. Maxillary palpi short filiform. Fore-wings in male with costal fold beneath enclosing hair pencil; veins 2 and 3 sometimes stalked, 5 absent, 9 absent. Hind-wings with cell nearly reaching $\frac{1}{2}$, veins 3 and 4 connate, 7 anastomosing with 8 to beyond middle.

The single species is a wide-ranging domestic insect whose true home is possibly America.

PLODIA INTERPUNCTELLA.

(*Plodia interpunctella*, Hub., Meyr., Handbook Brit. Lepid. 372.)

(Plate XLV., fig. 7 ♀.)

This distinctly-marked species has occurred at Wellington, and, owing to its domestic habits, will no doubt shortly establish itself throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rusty-brown speckled with blackish with the basal area wholly whitish-ochreous; the first and second lines are obscurely lead coloured and there is a rusty-ochreous discal spot. The hind-wings are very pale greyish-ochreous.

The larva is yellow-whitish with a darker dorsal line and the head and plate of segment 2 dark reddish-brown. It feeds on maize, figs, seeds, etc.

The perfect insect appears during the summer months, and may sometimes be found plentifully in corn-bins. It has been artificially spread by man throughout Europe, North America and Australia.

Genus 4.—EPHESTIA, Guen.

Face smooth. Antennae in male shortly ciliated. Labial palpi moderately long, curved, ascending, with appressed scales, terminal joint moderate, pointed. Maxillary palpi moderate, filiform. Fore-wings in male sometimes with costal fold beneath towards base, enclosing hair-pencil; vein 5 absent, 9 absent. Hind-wings: cell not reaching $\frac{1}{2}$, veins 3 and 4 connate or stalked, 5 absent, 7 anastomosing with 8 to beyond middle.

The species of this genus are few in number, but owing to their domestic habits, have been so promiscuously distributed through man's agency, that it is now uncertain from what country they were originally derived; it seems, however, not improbable that the majority are Asiatic. Imago with fore-wings narrow, costa gently arched.

Only one species has been detected in New Zealand.

EPHESTIA KUEHNIELLA.

(*Ephestia kuehniella*, Zell.; Meyr., Handbook Brit. Lep., 574.)

(Plate XLIV., fig. 13 ♀.)

This introduced pest was first detected in New Zealand by Mr. Philpott, who states that it is now established in the flour-mills throughout Otago.

^{*}Trans. N.Z. Inst. xx. 72.

The expansion of the wings is nearly 1 inch. The forewings are pale grey lightly speckled with darker grey, densest on the veins; the first line is indistinct, slightly bent outwards; the second line strongly indented near the costa, with darker dots on the veins; there are two blackish transversely-placed discal dots and a series of indistinct terminal dots. The hindwings are white, with the veins and termen very finely marked in pale brown.

The larva feeds on flour.

The perfect insect emerges from November till March.

Genus 5.—HOMOEOSOMA, Curt.

Tongue developed. Antennae in ♂ ciliated, with a notch above basal joint. Labial palpi moderately long, arched, ascending with appressed scales, terminal joint rather short, tolerably pointed. Maxillary palpi moderate, loosely scaled. Forewings with 4 and 5 stalked, 9 absent. Hindwings with cell not nearly reaching middle, 4 absent, 3 and 5 approximated or connate, 7 anastomosing with 8 to near apex. (Plate D., fig. 4, 5 neuration of *Homoeosoma vagella*; fig. 6 Head of ditto.)

A cosmopolitan genus, but not numerous in species. The larvae of this genus usually feed in heads of *Compositae*.

Represented in New Zealand by one species only.

HOMOEOSOMA VAGELLA.

(*Homoeosoma vagella*, Zell., Isis, 1848, 863; Meyr., Proc. Linn. Soc. N.S.W., 1878, 214: *anaspila*, Meyr., Trans. Ent. Soc. Lond., 1901, 566.)

(Plate XX., fig. 11 ♀.)

This species has been taken at Wellington by Mr. R. M. Sunley and at Invercargill by Mr. A. Philpott.

The expansion of the wings is just over 1 inch. The body is rather stout. The forewings are very narrow, elongate, with the termen very oblique, white, speckled with dark grey, especially towards the termen and dorsum; the first line is broad and cloudy, hardly reaching the costa; there is a large, elongate, pinkish-brown shading on the dorsum near the middle; the second line is rather wavy, very oblique, followed by a rather indistinct, straighter line. The hindwings are dull greyish ochreous, slightly darker towards the apex; the cilia of all the wings is grey.

The perfect insect appears from January to March. It seems to be extremely local and has usually been taken at light, but only at very irregular intervals. It is common throughout Australia.

Genus 6.—DELOGENES, Meyr.

Tongue developed. Antennae in male shortly ciliated, slightly sinuate and thickened towards base of stalk, basal joint moderate. Labial palpi moderate, sub-ascending, second joint considerably thickened with dense appressed scales, terminal joint very short, obtuse. Maxillary palpi imperceptible. Forewings with veins 4 and 5 stalked, 9 and 10 out of 8. Hindwings with cell not quite reaching middle; 3 and 4 stalked, 5 absent, 7 out of 6 anastomosing with 8.

(Plate A., figs. 1, 2, 3 neuration and head of *Delogenes timodora*.)

This remarkable and interesting genus is a notable addition to the scanty local representation of the family. Only the one species is known at present.

DELOGENES LIMODOXA.

(*Delogenes timodora*, Meyr., Trans. N.Z. Inst., 1., 132.)

(Plate XLIV., fig. 12 ♂.)

This very interesting insect was recently discovered by Mr. C. E. Clarke at Waitati, near Dunedin.

The expansion of the wings is nearly 1 inch. The forewings are pale bluish-grey with blackish-brown markings; the first line is almost straight, strongly oblique from about $\frac{1}{3}$ of costa to over $\frac{1}{2}$ of dorsum; one or two very obscure marks in the disc; the second line is strongly-marked, very irregularly dentate, emitting several short streaks inwards on the veins; there is a subterminal series of faint streaks and a terminal series of faint marks. The hindwings are very pale greyish-ochreous with whitish cilia.

Apart from the characteristic antennae of the family this species might easily be mistaken for a *Scoparia*.

The perfect insect appears towards the end of February. It is attached to grassy glades in sheltered Manuka scrub.

Described and figured from specimens kindly given to me by Mr. Clarke.

Sub-family 2.—GALLERIAEDES.

Maxillary palpi not triangular. Forewings with 8 and 9 out of 7. Hindwings with defined pecten of hairs on lower margin of cell.

A rather small sub-family of general distribution, but only represented in New Zealand by two artificially introduced species.

Genus 1.—MELIPHORA, Guen.

Labial palpi very short, in ♂ ascending, in ♀ porrected. Forewings with 4 and 5 stalked, 10 absent. Hindwings in ♂ with long dorsal hair pencil, 3 and 5 stalked, 4 absent, 7 anastomosing with 8 to beyond middle.

The single species is probably of European origin, but has been carried by man over a large part of the world.

MELIPHORA GRISELLA.

(*Meliphora grisella*, Fab., Ent. Syst., iii., 289; Meyr., Trans. N.Z. Inst., xx., 73; *anticella* Walk., Cat. xxviii., 483.)

(Plate XIX., fig. 21 ♀.)

This species has occurred at Wellington, Governor's Bay, Nelson and Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The head is light ochreous-yellow. The forewings have the costa strongly arched and the apex and tornus rounded; dull brownish-ochreous without markings. The hindwings are pale greyish-ochreous.

The larva is grey-whitish with a dark purplish dorsal line and the head and plate of the second segment dark brown. It feeds on wax in bee hives, often proving extremely destructive. It also feeds on dried apples. (Meyrick.)

The perfect insect appears in January, and frequents cultivated localities. It has evidently been artificially spread over a large part of the world, and is now found in Europe, Central Asia, North America and Australia.

Genus 2.—GALLERIA, Fab.

Face with strong projecting ridge of scales. Labial palpi in male moderate, sub-ascending, terminal joint curved inwards, naked, flattened, pointed, in female moderately long, porrected, with appressed scales. Fore-wings: cell in male enlarged, open, 4 and 5 approximated. Hind-wings: 4 and 5 stalked, sometimes coincident, 7 anastomosing shortly with 8. Imago with fore-wings sub-oblong, costa in male strongly, in female moderately arched, termen with a triangular submedian projection, stronger in male.

The single species included in this genus has been introduced by man.

GALLERIA MELLONELLA.

(*Galleria mellonella*, Lin., Syst. Nat. x., 537.)

(Plate LI., fig. 9 ♀.)

This well-known European insect has been found in bee-hives in the Taranaki and Ruakura districts. It has not been observed in the South Island.

The expansion of the wings is fully 1½ inches. The fore-wings are sub-oblong, with the termen almost straight, except a slight sinuation before tornus stronger in the male; dull reddish-brown; there is a large irregular ochreous blotch in the disc below middle reaching the dorsum; the second line is indicated by a few black streaks on the veins. The hind-wings are pale brownish-ochreous, bordered with dull brown around apex and termen.

The larva is pale dull grey; head and plate of segment 2 dark reddish-brown; feeds in old honey combs in bee-hives.*

Mr. Philpott informs me that he understands this insect was fairly common in the old box hives, but since the adoption of the frame hives, it is seldom met with.

Described and figured from a specimen in the Dominion Museum.

Sub-family 3.—CRAMBIDÆ.

Labial palpi usually very long, straight, porrected, loosely rough-scaled, attenuated forwards. Maxillary palpi well developed, strongly triangular. Fore-wings with 7 separate or out of 9. Hind-wings with defined pecten of hairs on lower margin of cell.

A large and interesting sub-family, found everywhere, but specially prominent in New Zealand, where they constitute one-fifteenth of the whole lepidopterous fauna; in Great Britain they form about one sixty-fifth. A remarkable feature is the absence of relationship with the Australian region, where *Talis* is the dominant genus of the family, and *Crambus* is virtually absent.

Represented in New Zealand by the nine following genera.

- | | |
|-----------------|-------------------|
| 1. OROCRAMBUS. | 5. TAUROSCEPA. |
| 2. CRAMBUS. | 6. SCENOPLOCA. |
| 3. PROTYPARCHA. | 7. TALIS. |
| 4. ARGYRIA. | 8. DIPTYCHOPHORA. |
| 9. GADIRA. | |

*Meyrick, British Lepidoptera, 586.

Genus 1.—OROCRAMBUS, Meyr.

Characters of *Crambus*, but with the under-surface of thorax and coxæ densely hairy; labial palpi clothed with dense rough hairs, except towards apex.

An interesting endemic genus, derived from *Crambus*.

The species included in this genus closely resemble *Crambus*, but are generally stouter and chiefly black in colour. They principally frequent high, mountainous districts, usually at elevations of from 4,000 to 5,000 feet above the sea-level. We have twelve species in New Zealand all of which are confined to the South Island.

OROCRAMBUS MELAMPETRUS.

(*Orocrambus melampetrus*, Meyr., Trans. N.Z. Inst. xvii., 133.)

(Plate XX., fig. 26 ♀.)

This species has occurred fairly commonly at Mount Arthur, Castle Hill, Arthur's Pass, Mount Hutt, Vanguard Peak and Humboldt Range, Lake Wakatipu, at elevations ranging from 4,000 to 5,600 feet above the sea-level.

The expansion of the wings is 1 inch. The fore-wings are very dark brownish-black and glossy with slight bluish reflections. There is a grey slightly-waved transverse band at about $\frac{1}{3}$ blending with the ground colour towards the termen. The hind-wings are very dark brown.

This is the most stoutly built species of the genus. In some specimens the transverse band of the fore-wings is much less distinct than in others.

The egg is barrel-shaped, with about 14 longitudinal ribs, and fine transverse lines between each rib. Colour ochreous-white. Length about one-fortieth of an inch.

The perfect insect appears early in January. It rests on bare shingle slopes in the hottest sunshine. When disturbed it flies with great rapidity, and hence it is very difficult to capture.

OROCRAMBUS MYLITES.

(*Orocrambus mylites*, Meyr., Trans. N.Z. Inst. xx. 67.)

(Plate XX., fig. 23 ♀.)

This species is very common on the Tableland of Mount Arthur and surrounding mountains, at elevations of from 4,000 to 5,000 feet above the sea-level.

The expansion of the wings is from $\frac{3}{4}$ to 1 inch. The fore-wings are dark bronzy brown, slightly paler towards the costa and dorsum; there is a central, whitish, longitudinal streak from base to termen much clouded with grey and often finely divided just before it reaches the termen; there is a black shading immediately above this streak and a broader, divergent black shading below it; the costa and dorsum are very faintly sprinkled with white scales. The hind-wings are very dark slaty grey, paler in the female; the cilia are grey with white tips.

This species is slightly variable in depth of colouring.

The perfect insect appears in January and February. It is extremely abundant where found, usually frequenting swampy hollows on the mountain sides, clothed with the fine wiry mountain grass (*Poa colensoi*), on which its larva probably feeds.

OROCRAMBUS CATACAUSTUS.

(*Orocrambus catacaustus*, Meyr., Trans. N.Z. Inst. xvii., 134; *Orocrambus catacaustus*, Meyr., ib. xx. 67.)

(Plate XX., fig. 25 ♂.)

This species has occurred at Mount Arthur (Nelson), Arthur's Pass (West Coast Road), The Hump, Southland, Hunter Mountains and Humboldt Range, Lake Wakatipu, at elevations of from 3,000 to 4,000 feet above the sea level.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are dark bronzy-brown with a rather narrow, cream-coloured, straight central longitudinal streak from the base to the termen; the costa is also very narrowly edged with white in the male; the cilia are dark grey with white tips. The hind-wings are very dark grey, with bronzy reflections; the cilia are grey tipped with white.

The perfect insect appears in December and January. It is somewhat local and generally frequents rather swampy situations, or open limestone valleys, flying with much activity in the hottest sunshine.

OROCRAMBUS VENTOSUS.

(*Orocrambus ventosus*, Meyr., Trans. N.Z. Inst., lli., 30.)

(Plate XLVIII., fig. 15 ♂, 16 ♀.)

This rather dull-looking, but very distinct species, was discovered by Stella Hudson on Mount Arthur on January 7, 1919.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are blackish-grey, very slightly sprinkled with dull ochreous-brown; on the terminal third the spaces between the veins are more or less distinctly marked in dull white; the cilia are dark grey mixed with whitish. The hind-wings are grey, darker towards the termen; the cilia are cream-coloured.

Apparently variable in the extent and distinctness of the white interneural markings. In some specimens there are traces of darker discal and subterminal transverse lines.

The perfect insect was found abundantly on the open grassy mountain side at about 4,300 feet above the sea-level. Owing to the extremely backward character of the season of 1918-1919 it seems probable that, in normal years, this species would appear in the late spring, or early summer.

OROCRAMBUS PERVIUS.

(*Orocrambus pervius*, Meyr., Trans. N.Z. Inst., xlv., 118.)

(Plate XX., fig. 24 ♂.)

This species occurs commonly on Arthur's Pass and on the high country around Lake Harris, beyond the head of Lake Wakatipu, at elevations of between 3,000 and 4,000 feet above the sea-level. It has also been found on the Hunter Mountains.

The expansion of the wings is about 1 inch. Very like *Orocrambus catacaustus*, from which it is stated to differ in having the central white longitudinal streak distinctly interrupted in the middle, and the termen oblique on its upper portion, instead of straight as in *O. catacaustus*.

The perfect insect appears from December till February, and frequents tussocks and other mountain vegetation.

OROCRAMBUS SUBITUS.

(*Orocrambus subitus*, Philp., Trans. N.Z. Inst., xlv., 116.)

(Plate XIX., fig. 3 ♂, 4 ♀.)

This very distinctly-marked little species was discovered by Mr. Philpott on the Hump Ridge, Southland, at an elevation of 3,500 feet above the sea-level and appears to be fairly common in that locality. It has also occurred on the Humboldt Range, Longwood Range, and Hunter Mountains.

The expansion of the wings is nearly $\frac{3}{4}$ inch. The fore-wings are elongate-triangular with the termen obliquely rounded; golden-brown, clouded with white in the disc and towards the apex; there is a thick black streak from the base to beyond the middle, a short black stripe in the disc above the middle and another on the dorsum at the base; a subterminal series of black marks; all these black markings are more or less surrounded with golden-yellow scales. The hind-wings are blackish-grey. In the female the ground colour of all the wings is paler and greyer and the black streaks are margined with orange.

The perfect insect appears from December till February and frequents open slopes on the mountain sides.

OROCRAMBUS THYMIASITES.

(*Orocrambus thymiasites*, Meyr., Trans. Ent. Soc. London, 1901, 567.)

(Plate XX., fig. 21 ♂.)

This striking species was discovered by Mr. A. Philpott at Seaward Moss, near Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are very dark brownish-black, slightly tinged with very dark red near the costa and termen, the central portion of the wing being almost black; there is a fine, slightly arched, yellowish-white, longitudinal streak from the middle of the base to about $\frac{3}{4}$ near the dorsum, and another short, rather broader, slightly arched, streak from a little before the end of the first streak almost as far as the termen; there is also a very short whitish mark near the base on the dorsum. The hind-wings are very dark brownish-black.

The perfect insect appears in January and February. At present it has only been taken at Seaward Moss, but, according to Mr. Philpott, it is very abundant in that locality.*

OROCRAMBUS CAESIUS.

(*Orocrambus caesius*, Philp., Trans. N.Z. Inst., lvi., 390.)

(Plate LI., fig. 16 ♂.)

This fine species was discovered by Mr. Philpott on Gordon's Pyramid, near Mount Arthur, at an elevation of 5,000 feet above the sea-level. Mr. C. E. Clarke has also taken it on Mount Moltke, near the Franz Joseph Glacier, at the same altitude.

The expansion of the wings is slightly over 1 inch. The fore-wings are elongate-oblong with the termen almost straight; pale blue, heavily sprinkled with black scales, the markings are also black; several indistinct blotches on basal area; the first line, which has two very strong projections towards disc, extends

*Trans. N.Z. Inst. xxxvi., 167.

from costa at nearly $\frac{1}{2}$ to dorsum at about $\frac{1}{3}$; the orbicular stigma is very elongate, jet black; the reniform is heavily outlined in black, with one very distinct pale centre and a partially enclosed pale spot immediately below this; a curved series of blackish dashes, from costa beyond reniform to about $\frac{1}{3}$ of dorsum, represents the second line; a very indistinct subterminal shading, except at tornus; the cilia are greyish-ochreous, darker towards base. The hind-wings are very deep ochreous-grey, becoming almost black towards termen; the cilia are greyish-ochreous.

The perfect insect appears in January.

Described and figured from a specimen kindly submitted by Mr. Philpott.

OROCRAMBUS TRITONELLUS.

(*Crambus tritonellus*, Meyr., Trans. N.Z. Inst., xvii., 134.)

(Plate XX., fig. 27 ♂.)

This very local species, which is paler in its colouring than any of its congeners, has occurred on Mount Grey, North Canterbury, at Broken River and at Castle Hill, West Coast Road.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate-triangular with the termen rather oblique; dark ochreous-brown, with the veins marked in black, except near the costa; there is a straight whitish stripe from the base to the termen, slightly above the middle; a very fine whitish line along the costal edge, and an indistinct streak before the apex. The hind-wings are pale ochreous-brown, clouded with grey between the veins.

The perfect insect appears in November.

Described and figured from a single specimen in Mr. Philpott's collection, captured by Mr. J. H. Lewis. The type specimen, in Mr. Meyrick's collection, was discovered by Mr. J. D. Enys.

OROCRAMBUS MACHAERISTES.

(*Orocrambus machaeristes*, Meyr., Trans. Ent. Soc. Lond., 1905, 224.)

(Plate XX., fig. 22 ♀.)

This striking species is very common on Mount Earnslaw and on the Humboldt Range at the head of Lake Wakatipu at an elevation of about 5,000 feet above the sea-level. It has also occurred on Arthur's Pass and Vanguard Peak.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dark blackish-grey; there is an elongate, thin, wedge-shaped, white, central mark from the base to about $\frac{1}{3}$ broadly bordered with black beneath and towards termen; the black border extends upwards towards the costa in the form of two or three irregular black marks; beyond the central marking the wing is speckled with white; there is a curved series of small black dots near the termen, the termen itself being broadly bordered with black. The hind-wings are dark blackish-brown, darker near the termen.

This species varies considerably in the extent of the whitish speckling on the fore-wings near the termen, but is easily recognised by the narrow wedge-shaped white central marking.

The perfect insect appears from December till February. It frequents the snowgrass on the high mountain sides, flying with great activity in the hottest sunshine, and in such situations it is often very abundant.

OROCRAMBUS SCOPARIOIDES.

(*Orocrambus scoparioides*, Philp., Trans. N.Z. Inst., xlv., 119.)

(Plate XLV., fig. 1 ♀.)

This bright-looking little insect was discovered by Mr. Fenwick on Ben Lomond, Lake Wakatipu, at elevations between 3,000 and 4,000 feet above the sea-level. It has also occurred at Paradise and Commissioners Creek.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are elongate-triangular with the termen slightly oblique; very warm reddish-brown with the veins irregularly streaked with black; the other markings are pale ochreous; there is a small patch on the dorsum at the base; the first line is rather indistinct with two indentations; there are traces of a pale ochreous median shade; the second line is very distinct, slightly wavy, angulated below costa. The hind-wings are dark brown, darker towards the termen. The cilia of all the wings are bright ochreous-brown.

The perfect insect appears from December to February, and frequents marshy places on the mountain side.

Described and figured from a specimen in the Fenwick collection.

OROCRAMBUS CULTUS.

(*Orocrambus cultus*, Philp., Trans. N.Z. Inst., xlv., 242.)

(Plate XLIV., fig. 10 ♀.)

This very distinctly-marked species was discovered by Mr. Paseo on Cecil Peak, near Queenstown, Lake Wakatipu.

The expansion of the wings is barely 1 inch. The fore-wings are deep yellowish-brown; there are dusky blackish longitudinal shadings on the costa, below the middle, and on the dorsum; a broad broken whitish-ochreous longitudinal streak extends from the base to $\frac{1}{3}$, below the middle; there are two elongate marks above this; a whitish-ochreous line crosses the wing at $\frac{1}{2}$ sharply bent outwards just below the costa; all the principal veins are marked with blackish streaks, and there is a terminal series of whitish dots. The hind-wings are dark greyish-ochreous.

The perfect insect appears in January.

Described and figured from a specimen in the Paseo collection.

Genus 2.—CRAMBUS, Fab.

Fore-wings with 4 and 5 sometimes stalked, 7 and 8 out of 9. Hind-wings with 4 and 5 connate or stalked, 7 out of 6, anastomosing with 8. (Plate D., figs. 11, 12, 13 neuriation and head of *Crambus vitellus*.)

A very large genus, common throughout the world, except in Australia, where there are no indigenous species, and the Indo-Malayan region, where there are comparatively few. The larvae probably nearly all feed amongst stems or roots of grass, or seldom on moss, but are little known, notwithstanding their abundance. The New Zealand species are all endemic. The insects comprised in this familiar genus are, as a rule, very similar in superficial appearance. They chiefly frequent open, grassy coun-

*In some specimens vein 9 is missing and veins 4 and 5 are sometimes stalked and sometimes simple.

try and are especially characteristic of the tussock plains of the South Island. Many species also occur on grassy mountain sides, their place being taken at elevations exceeding about 5,000 feet above the sea-level by the members of the closely allied genus *Orocrambus*. On the elevated tussock plains in the centre of the North Island, several species of *Crambus* are very abundant, and *Crambus ramosellus* and *C. flexuosellus* are both very common on the edges of the forest, in many parts of the North Island. Generally speaking, however, it may be said that the genus is very much better represented, both as regards species and individuals, in the south, than in the north, the *Crambi* in the extreme north being, in fact, rare and insignificant. These insects are very efficiently protected when hiding amongst grass. The elongate fore-wings are closely wrapped around the body, and completely envelope the fan-like hind-wings. The exposed portions of the fore-wings are generally striped with white, on an ochreous-brown ground colour, and when the insect is closely clinging to a blade of grass, in the midst of a tussock, its resemblance to its surroundings renders its discovery almost impossible. The genus is represented in New Zealand by forty-five species and others, no doubt, are still awaiting discovery. Of the known species, twenty-nine are restricted to the South Island; thirteen common to both islands; two restricted to the North Island, and one to the Chatham Islands.

CRAMBUS CORRUPTUS.

(*Hypochalcia corrupta*, But., Proc. Zool. Soc. Lond., 1877, 399, Pl. xliii., 9; *Crambus corruptus*, Meyr., Trans. N.Z. Inst., xv., 20; *Crambus luridus*, Huds., Ent. Mo. Mag. lix., 64.)

(Plate XX, fig. 1 ♂.)

This species has occurred on the Lyttelton Hills, and at Mount Hutt. It is very abundant at Ida Valley in Central Otago, at about 2,500 feet above the sea-level.

The expansion of the wings of the male is nearly $\frac{1}{2}$ inch; of the female slightly over $\frac{1}{2}$ inch. The fore-wings, which have the apex rather acute, are pale brownish-ochreous; there is a very fine white streak along costa from base to near middle and another below this from middle to apex; a conspicuous central longitudinal white streak from base to middle of termen, attenuated at each end and indented below at about $\frac{1}{2}$; a suffused whitish band along dorsum; there is a small black mark near dorsum at base; two elongate black blotches in disc at about $\frac{1}{2}$, one above and one below the central stripe; two shorter and broader blotches similarly placed beyond middle and a broad blackish terminal band interrupted by the central white stripe; the cilia are greyish-ochreous, clouded with white below apex. The hind-wings are greyish-ochreous with a broad dusky border; the cilia are pale greyish-ochreous.

There is considerable variation in the extent and distinctness of the black markings, and in the ground colour, which in some specimens is a deep lurid yellow (*C. luridus*); the fine white costal streaks are also sometimes very indistinct. The black discal blotches above and below the central streak are, however, always present and constitute a good distinctive character.

The perfect insect appears in October and November.

CRAMBUS HELIOTES.

(*Crambus heliotes*, Meyr., Trans. N.Z. Inst., xx., 68.)

(Plate XIX, fig. 6 ♂, 5 ♀.)

This brightly-coloured and very distinct little species has occurred in the North Island at Waimarino, Waiouru and Puketitiri (Hawkes Bay). In the South Island it has been found on the Mount Arthur Tableland, at an elevation of about 3,600 feet, and in the Rees Valley near Lake Wakatipu.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings of the male are rich brown with a very obscure, paler, transverse band a little before the termen. The hind-wings are bright orange-yellow with the cilia dull brown. The head, thorax and abdomen are brown. The female is slightly larger and paler than the male. Some specimens of both sexes have two or three short, silvery-white, longitudinal streaks on the fore-wings, and the insect varies generally in the depth of its colouring.

The perfect insect appears in January and February. It is found in damp, mossy situations and is extremely local, although abundant where found. It flies rapidly in the hottest sunshine.

CRAMBUS ANTIMORUS.

(*Crambus antimorus*, Meyr., Trans. Ent. Soc. Lond., 1901, 567.)

(Plate XIX, fig. 23 ♂.)

This pretty little species is fairly common on the old moraines near the Hermitage at Mount Cook, at elevations of from 2,500 to 3,000 feet above the sea-level.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are brownish-ochreous with bronzy golden reflections; the costa is narrowly edged with clear white; there is a rather broad, central, longitudinal, white streak from the base to the termen, becoming narrower just before it reaches the termen; the dorsum is narrowly edged with white. The hind-wings are white, broadly shaded with brown on the termen. The cilia of all the wings are white. The head and thorax are bronzy-brown, the abdomen greyish-brown.

The perfect insect appears in December. At present it is only known from the single locality given.

CRAMBUS HETERANTHES.

(*Crambus heteranthes*, Meyr., Trans. Ent. Soc. London, 1901, 568.)

(Plate XIX, fig. 7 ♂.)

This neatly-marked little insect is common on the old moraines near the Mount Cook Hermitage.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are dark brown with strong bronzy reflections; there is a single, clear white, moderately broad, central, longitudinal, streak from the base to the termen, which rapidly becomes much narrower just before it reaches the termen. The hind-wings are uniform dark brown. The cilia of all the wings are grey tipped with paler grey.

The perfect insect appears in December.

CRAMBUS SARISTES.

(Crambus saristes, Meyr., Trans. N.Z. Inst. xli., 8.)

(Plate XLV., fig. 18 ♀.)

At present this species has only occurred at Seaward Moss, near Invercargill.

The expansion of the wing is $\frac{5}{8}$ inch. It differs from *C. heteranthes* in the following respects:—The general colouring is slightly brighter; the central streak of the fore-wings is tinged with dull yellow, suddenly narrower on its terminal fourth, the end of the preceding portion forming a faint short acute projection below it; the dorsum, on the under-side of the fore-wings, and the costa on the underside of the hind-wings, are not clouded with white.

The perfect insect appears from November till January. It is possible that when a larger number of specimens are available for examination, this species will prove to be merely a local variety of *Crambus heteranthes*.

CRAMBUS AULISTES.

(Crambus aulistes, Meyr., Trans. N.Z. Inst., xli., 9.)

This species has occurred at Invercargill.

It is stated to be distinguished from the closely allied forms known as *C. meristes*, *saristes*, *aethonellus*, and *melitastes* by the suffused white line on posterior half of costa only.

I am unacquainted with this insect.

CRAMBUS MERISTES.

(Crambus meristes, Meyr., Trans. N.Z. Inst., li., 351.)

This species was discovered by Mr. Philpott on Longwood Range, Southland, at an altitude of about 2,700 feet above the sea-level.

The expansion of the wings is about $\frac{3}{4}$ inch. Head, palpi, and thorax dark brown, palpi whitish towards base beneath. Abdomen dark grey. Fore-wings elongate, posteriorly dilated, costa slightly arched, apex obtuse-pointed, termen slightly rounded, somewhat oblique; dark brown; a moderate ochreous-white median longitudinal streak from base to termen, slightly narrowed towards extremities; cilia grey. Hind-wings dark grey; cilia grey or whitish-grey, or in female whitish, with grey subbasal line.

The perfect insect appears in December.

I am unacquainted with this species, which appears to be distinguished from the very closely allied forms, by the absence of any white streak on the costa.

CRAMBUS AETHONELLUS.

(Crambus aethonellus, Meyr., Trans. N.Z. Inst., xv., 19; xli., 9.)

This species has occurred at Mount Hutt, Flagstaff Hill, Wedderburn, Longwood Range, and the Takitimu Mountains.

The expansion of the wings is about $\frac{3}{4}$ inch. The insect is extremely like *Crambus melitastes* from which it is said to differ in the following respects:—The costal edge of the fore-wings is ochreous-whitish throughout, there is no white streak on the upper part of the termen or in the cilia; the hind-wings are without the pale yellowish costal patch, but with the cilia clear

pale yellowish, except the basal line; the under surface of the fore-wings is suffused with grey, except towards the costa and on a median streak; the underside of the hind-wings is partly greyish between the veins. The antennae of the male are pubescent-ciliated—that is clothed with short pubescence over their whole surface, but with a row of somewhat longer cilia on one side; in *C. melitastes* the antennae are devoid of pubescence but simply ciliated on one side (Meyrick).*

The perfect insect appears in December and January.

CRAMBUS MELITASTES.

(Crambus melitastes, Meyr., Trans. N.Z. Inst., xli., 9.)

(Plate XIX., fig. 8 ♂; 9 ♀.)

This bright little species is common in the neighbourhood of Invercargill.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch; of the female barely $\frac{1}{2}$ inch. The fore-wings of the male are rather bright ochreous-brown, there is a very distinct, central, longitudinal whitish streak somewhat broader near the middle and a very narrow indistinct white mark on the termen above the central streak; the cilia are pale brown with a white basal line above the central streak. The hind-wings are dark brown with a broad whitish-ochreous streak from the base to about $\frac{1}{2}$; the cilia are brownish-ochreous. In the female the ground colour of the fore-wings is darker; there is a narrow white streak close to the costa, and a broader white streak close to the dorsum, both in addition to the central streak. Occasionally the fore-wings are wholly whitish-grey.

The perfect insect appears in December and January. It is common in dry, open situations, and is extremely plentiful on the coastal sandhills. The female does not take wing so readily as the male, and has a more feeble flight; that of the male being rapid and often sustained for some time. (Philpott.) It seems to be quite confined to the far south.

If this species proves to be identical with that form now known as *Crambus aethonellus*, it will have to bear the name of *C. aethonellus*, which has priority.

CRAMBUS APSELIAS.

(Crambus apselias, Meyr., Trans. N.Z. Inst., xxxix., 108.)

(Plate XX., fig. 13 ♂.)

This species has occurred at Springfield, Castle Hill, Cora Lynn, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is about $1\frac{1}{4}$ inches. The fore-wings are pale brassy ochreous and very glossy; there is a rather indistinct white, central, longitudinal streak, bordered above and below with rather indefinite brownish-ochreous bands; the spaces between the veins are more or less clearly marked in white, and the veins themselves in brownish-ochreous. The hind-wings are very pale whitish-ochreous, faintly clouded with brown towards the apex; the cilia of all the wings are whitish-ochreous.

This species is very closely allied to *Crambus ramosellus*, but is always easily separated by the obsolescence or absence of the black terminal dots.

The perfect insect appears from December till April. It frequents the outskirts of forest and open country, and is attracted by light.

*Trans. N.Z. Inst., xli., 9.

CRAMBUS RAMOSELLUS.

(*Crambus ramosellus*, Dbld., Dieff. New Zeal., Vol. ii., 288; Meyr., Trans. N.Z. Inst., xv., 21; *Crambus rangona*, Feld., Reis. Nov., Pl. cxxxvii., 25; *leucanialis*, Bull., Proc. Zool. Soc. Lond., 1877, 401.)

(Plate XX., figs. 29, 30 varieties.)

This pretty species is very common and generally distributed throughout the country, and is also found on Stewart Island and on the Chatham Islands.

The expansion of the wings varies from 1 inch to 1½ inches. The fore-wings are pale ochreous; there is a pale brown, longitudinal, shaded band on the costa from the base to about $\frac{2}{3}$ followed by a whitish stripe from the base to about $\frac{2}{3}$; next a dark blackish brown central stripe from the base to $\frac{2}{3}$ becoming much fainter from $\frac{2}{3}$ to $\frac{1}{2}$ and ending considerably before the termen; there are often two or three brownish-black spots at about $\frac{2}{3}$, a curved series of dots a little before $\frac{1}{2}$ and another series on the termen. The hind-wings are ochreous, shaded with pale brown on the termen near the tornus. The cilia of all the wings are ochreous.

This species varies considerably in size, in the depth of colouring, in the extent of the whitish central stripe and distinctness of the transverse series of dots. Numerous specimens from many localities bear out Mr. Meyrick's remark that, in general, Northern specimens seem to be smaller, darker and more distinctly marked than Southern.

The perfect insect appears from December till April. It is usually very common in grassy, open situations, and is often abundant in gardens and other cultivated localities. Stragglers may occasionally be met with as late as June.

CRAMBUS CONOPIAS.

(*Crambus conopias*, Meyr., Trans. N.Z. Inst. xxxix., 109.)

This very inconspicuous species was discovered at Ida Valley, Otago, by Mr. J. H. Lewis. It has also occurred in the Routeburn Valley at the head of Lake Wakatipu.

The expansion of the wings is barely 1 inch. The head is white with a faint central ochreous line, the face forming a conical projection. The thorax is very pale ochreous with an indistinct white dorsal stripe. The fore-wings are very elongate, narrow, with the termen oblique, pale brownish-ochreous; there is a moderately broad, central, longitudinal stripe from the base to the termen, margined with dark brown above from $\frac{1}{3}$ to the termen and beneath from the base to about $\frac{2}{3}$; the veins are indistinctly marked in brown, especially below the central stripe; there is a slight white projection from the central stripe towards the costa at about $\frac{2}{3}$ and a very indistinct series of brown marks on the veins representing the second line; the veins are terminated by indistinct dots. The hind-wings are very pale brownish-ochreous; the cilia of all the wings are white.

The perfect insect appears from November till January. Mr. Meyrick states that it is "Apparently more allied to *C. ramosellus* than to any other New Zealand species, but very distinct by the frontal cone; there would seem to be undoubted affinity to the European *C. inquamellus*."

CRAMBUS ANGUSTIPENNIS.

(*Chilo angustipennis*, Zell., Hor. Soc. Ent. Ross., 1877, 15, Pl. i., 3; *Crambus angustipennis*, Meyr., Trans. N.Z. Inst., xv., 22.)

(Plate XX., fig. 38 ♀.)

This large and conspicuous species has occurred in the North Island at Waipukurau, Wainuiomata, and on the eastern side of Wellington Harbour. In the South Island it has been found at Christchurch, Rakaia, Castle Hill and Invercargill.

The expansion of the wings is about 1½ inches. The fore-wings are very elongate, sharply pointed at the apex, especially in the female, with the termen very oblique; pale ochreous with the veins broadly clouded with white near the costa so that the costal half of the wing appears whitish; a rather broad white streak on the dorsum from the base to the tornus margined above at the base with brown and bordered beneath on the dorsal edge by a slender brown streak from $\frac{1}{3}$ to the tornus. The hind-wings are white, sometimes slightly tinged with ochreous. The cilia of all the wings are white.

The perfect insect appears in December, January, and March, frequenting the toetoe-grass (*Arundo conspiciua*), but is rarely met with.

CRAMBUS EPHORUS.

(*Crambus ephorus*, Meyr., Trans. N.Z. Inst., xvii., 135.)

(Plate XLVIII., fig. 17 ♂.)

A single specimen of this remarkable-looking species was discovered by Mr. Meyrick, in 1883, on Arthur's Pass at an altitude of about 4,800 feet above the sea-level. It was not again taken, until February, 1920, when two specimens were captured in the same locality and subsequently further examples were found by Mr. C. E. Clarke.

The expansion of the wings is about 1½ inches. The head is snow-white. The palpi are very long, ochreous above and internally snow-white. The thorax is snow-white; the patagia deep ochreous yellow. The fore-wings are very long narrow shining snow-white; the extreme costal edge is brownish becoming yellow-ochreous towards the apex; there is a rather broad, straight, bright deep ochreous-yellow stripe from the base below the middle to the termen above the tornus; the dorsum is narrowly ochreous-yellow from $\frac{1}{3}$ to the tornus; the cilia are snow-white, opposite submedian stripe and on tornus whitish-ochreous. The hind-wings are pale ochreous-grey.

The perfect insect appears in January and February, and may be looked for amongst rough herbage on the mountain side, between 3,500 and 4,800 feet.

CRAMBUS CORYLANUS.

(*Crambus corylana*, Clarke, Trans. N.Z. Inst., lvi., 417.)

This species was discovered by Mr. Charles E. Clarke at the base of Mount Ida in Central Otago.

It closely resembles *Crambus ephorus*, but is less bright and has the wide ochreous stripe extending transversely to dorsum along outer $\frac{1}{3}$.

The perfect insect appears in February.

CRAMBUS ISOCHYTUS.

(*Crambus isochytus*, Meyr., Trans. N.Z. Inst., xx., 68.)

(Plate XX., fig. 10 ♂.)

This very large and conspicuous species occurs occasionally on the Tableland of Mount Arthur, at elevations of from 3,500 to 4,500 feet above the sea-level.

The expansion of the wings is slightly over 1½ inches. The fore-wings are dull brownish-ochreous very slightly brassy-tinged; there is a narrow longitudinal white streak on the costa not quite reaching the apex; a moderately broad central streak; a rather narrow streak along the dorsum narrowly edged with brown just before the terminus. The hind-wings are dull whitish-ochreous. The cilia of all the wings are white.

The perfect insect appears in January and February. It is not a common species.

CRAMBUS DICRENELLUS.

(*Crambus dicrenellus*, Meyr., Trans. N.Z. Inst., xv., 22.)

(Plate XX., fig. 18 ♀.)

This species has occurred at Lake Peel near Mount Arthur at an elevation of about 4,000 feet above the sea-level, Castle Hill at about 2,000 feet, Springfield, Arthur's Pass, and in the Rees Valley near Lake Wakatipu.

The expansion of the wings is about 1½ inches. The fore-wings are brownish-ochreous with brassy green reflections, especially near the middle; there is a very narrow longitudinal white streak on the costa, becoming broader at about ¾; a slender slightly curved longitudinal white streak from the base to the termen; an indistinct whitish shading along the dorsum. The head is clear white, except behind the eyes; the palpi brown, except on their inner surfaces which are white, and the thorax brown with a broad central white band. The hind-wings are dull white, shaded with very pale greyish-brown near the apex. The cilia of all the wings are dull white.

The perfect insect appears in January. It is rather a local species. This insect is very closely allied to *Crambus isochytus*, but is considerably smaller and the white dorsal line of the fore-wings is usually less distinct than in that species.

CRAMBUS DIPLORRHUS.

(*Crambus diplorrhous*, Meyr., Trans. N.Z. Inst., xvii., 136.)

(Plate XX., fig. 19 ♀.)

This species has occurred at Castle Hill and on the mountains around Lake Wakatipu at elevations of from 2,000 to 5,000 feet above the sea-level.

The expansion of the wings is about 1½ inches. It resembles *Crambus dicrenellus* but is considerably larger; the apex of the fore-wing is less pointed, the termen straighter and the uppermost white streak slightly below the costa instead of actually on the costa.

The perfect insect appears in December, January and February, and frequents dry situations on the mountain sides.

CRAMBUS OPPOSITUS.

(*Crambus oppositus*, Philp., Trans. N.Z. Inst., xlvii., 197.)

(Plate XLIV., fig. 1 ♂, 2 ♀.)

This very distinct species was discovered by Mr. Philpott on Mount Cleughearn near Lake Monowai. It also occurs on the Hump Range, Southland.

The expansion of the wings is slightly over 1½ inches. The fore-wings are blackish-grey with very strong brassy reflections; there is a broad white stripe from the base a little above the middle, which is slightly curved downwards before it reaches the termen; the costa and dorsum are narrowly edged with white; the top of the head and a narrow central band on the thorax are also white. The hind-wings in the male are dark blackish-grey; in the female very pale whitish-ochreous. The female also has the termen of the fore-wings narrowly clouded with white.

The perfect insect appears in December and January and is found on open country between 3,000 and 4,000 feet above the sea-level.

Described and figured from specimens kindly given to me by Mr. Philpott.

CRAMBUS SCUTATUS.

(*Crambus scutatus*, Philp., Trans. N.Z. Inst., xlix., 242.)

(Plate XLIV., fig. 3 ♂.)

This handsome species was discovered by Mr. Philpott on Longwood Range, Southland, at an elevation of about 2,700 feet above the sea-level.

The expansion of the wings is nearly 1½ inches. The fore-wings, which have the costa rather strongly arched before the apex, the termen very oblique, are deep bronzy-ochreous; there is a narrow whitish streak along the costal edge except near the apex, where it leaves the edge and divides into two; a broad, clear, white, central longitudinal streak, finely divided by a black line near the termen and a rather broad whitish streak along the dorsum. The hind-wings are dark grey. The cilia of all the wings are very pale brownish-ochreous.

This species closely resembles *C. oppositus* but the costal and dorsal streaks are much broader and the fore-wings brighter coloured than in that species.

The perfect insect appears at the end of December.

Described and figured from a specimen in Mr. Philpott's collection.

CRAMBUS HETERAULUS.

(*Crambus heteraulus*, Meyr., Trans. Ent. Soc. Lond., 1905, 225.)

(Plate XX., fig. 37 ♀.)

This species was discovered on the Humboldt Range at the head of Lake Wakatipu, occurring at elevations of from 3,600 to 4,000 feet. It is also very common in the Routeburn Valley.

The expansion of the wings is about 1½ inches. The fore-wings are brownish-ochreous with strong brassy reflections; there is a rather narrow, central, longitudinal, white streak FROM THE BASE TO ABOUT TWO-THIRDS, thence continued as three rather obscure white interneurine lines to the termen; there are two indistinct triangular white marks on the termen below the apex, and a cloudy white mark on the costa just before the apex; a very slender blackish streak is situated below the central stripe, and another similar line above and beyond the end of the central stripe. The hind-wings are dull white, darker near the apex. The cilia of all the wings are white.

The perfect insect appears in February and March.

It is evidently a local species, but common where found.

CRAMBUS CRENAEUS.

(*Crambus crenaeus*, Meyr., Trans. N.Z. Inst., xvii., 135.)

(Plate XX., fig. 9 ♀.)

This fine species is very common on the Tableland of Mount Arthur at elevations of from 3,600 to 4,000 feet above the sea-level. It has also been found at similar altitudes on Arthur's Pass, and on several of the mountains at the head of Lake Wakatipu. It occurs at lower altitudes at Springfield and near Dunedin.

The expansion of the wings is about 1½ inches. The forewings are pale brownish-ochreous, slightly brassy tinged and much browner in the middle; there is a straight longitudinal white streak from the base to the termen above the middle and the dorsum is very narrowly margined with white close to the base; there are no other white markings. The hind-wings are very pale greyish-white; the cilia of all the wings are white. The palpi are very long. The head and thorax are pale ochreous with the sides of the palpi and thorax pale brown.

This handsome insect appears in January and February. It is often very abundant on grassy mountain sides, and flies readily in calm sunny weather. On cold cloudy days, however, not a specimen is to be seen, the moths retreating into the midst of the tussocks, where their protective colouring and secretive habits usually prevent their discovery, even when specially searched for. On the Mount Arthur Tableland, I have observed this insect assembling in large numbers on veronica flowers, in shady places, at about 6 p.m.

CRAMBUS HAPLOTOMUS.

(*Crambus haplotomus*, Meyr., Trans. N.Z. Inst., xv., 23.)

(Plate XX., fig. 7 ♂.)

This pretty insect has been taken at Castle Hill at elevations of from 2,500 to 3,000 feet and at Arthur's Pass between 4,000 and 5,000 feet. It also occurs sparingly at the head of Lake Wakatipu.

The expansion of the wings is about 1½ inches. The forewings are rather dull ochreous, brassy-tinged; the costa is very finely edged with white; there are two or three very fine, short, white streaks below the apex near the termen, a slender, well defined central longitudinal white streak from the base to the termen, narrower near the base and slightly curved towards the termen; it is finely bordered below with dark brown from the base to about ¾ and with paler brown above near the termen; there are seven extremely minute black dots on the termen. The hind-wings are pale grey, shaded with darker grey towards the termen. The cilia of all the wings are dull white.

Mr. Meyrick remarks "that this species and *C. callirrhous* differ somewhat in form of wing from those most nearly allied to them, the fore-wings being somewhat less dilated and the termen less perceptibly sinuate and more strongly rounded. *C. haplotomus* differs from all its nearest allies in the absence of the broad white thoracic stripe (only in the much paler *C. simplex* is this occasionally obsolete) and in the presence of a complete terminal row of minute black dots."

This species frequents the open grassy spaces at Paradise, Glenorchy and Kinloch, near the head of Lake Wakatipu.

CRAMBUS ENCHOPHORUS.

(*Crambus enchophorus*, Meyr., Trans. N.Z. Inst., xvii., 136.)

(Plate XX., fig. 16 ♀.)

This species has occurred on the Dun Mountain, Mt. Arthur and at Castle Hill at elevations of from 2,000 to 4,000 feet above the sea-level. It has also been taken at Waikari and on the Otago Peninsula.

The expansion of the wing is about 1½ inches. The forewings are dull brownish ochreous with the veins marked in pale ochreous or dull white; there is an obscure white stripe on the costa, a rather slender, almost straight central white streak faintly edged with brownish black, a small brown mark on the dorsum near the base, a curved row of black dots on the veins before the termen and another row on the termen. The hindwings are pale dull ochreous, slightly darker towards the termen. The cilia of all the wings are dull white. The palpi are white; there is a central white stripe on the thorax and two short white stripes on the sides of the thorax.

The perfect insect appears in February and March. It is not by any means common or generally distributed.

In this species the markings are less definite than in *C. callirrhous* and the two rows of black dots are absent in that species. The present insect is larger than *C. pedias*, which is duller and greyer with the termen more sinuate and distinctly dotted with black.

CRAMBUS CALLIRRHIOUS.

(*Crambus callirrhous*, Meyr., Trans. N.Z. Inst., xv., 24.)

(Plate XX., fig. 34 ♂.)

This very neatly-marked species is not generally distributed. It has occurred at Christchurch, Castle Hill, Lake Guyon, and at New River, near Invercargill.

The expansion of the wings is 1½ inches. The forewings are deep ochreous, slightly brassy-tinged; the costa is finely edged with white; there are two very fine white lines below the apex; the upper from about five-sixths, the lower from half; a rather narrow, almost straight central streak from the base to the termen above the middle, very finely margined with grey; there is a very indistinct fine white streak from the base along the dorsum to ¾, thence extending slightly inwards to the torus. The hind-wings are greyish-ochreous.

The perfect insect appears in January, February and March, and frequents sandhills.

CRAMBUS SCITULUS.

(*Crambus scitulus*, Philp., Trans. N.Z. Inst., lvi., 390.)

(Plate LI., fig. 23 ♂.)

This very distinctly-marked, handsome species was discovered by Mr. S. Lindsay, on Mount Arthur, at an altitude of 4,000 feet above the sea-level.

The expansion of the wings is 1½ inches. In its general markings it closely resembles *Crambus callirrhous*, but differs in the following important respects:—The forewings are somewhat broader; their ground colour is very dark brassy brown, appearing in certain lights almost black, especially towards base; there is a series of black terminal marks, and the veins are finely marked in black before termen.

The perfect insect appears in January.

Described and figured from specimen submitted by Mr. Philpott.

CRAMBUS SCHEDIAS.

(*Crambus schedias*, Meyr., Trans. N.Z. Inst., xliii., 60.)

(Plate XX., fig. 33 ♂.)

This seems to be a very local species. At present it has only been found at Wellington but is probably often overlooked.

The expansion of the wings is 1 inch. Apart from its smaller size it differs from *C. callirrhous* in having the fore-wings slightly narrower; the ground colour slightly browner; the head and a broad central band on the thorax shining white and the hind-wings less tinged with grey. The absence of the more numerous, prolonged, and well-defined intercostal streaks is also a good distinctive character.

The perfect insect appears in March and April, frequenting open grassy places near the sea-coast.

CRAMBUS PEDIAS.

(*Crambus pedias*, Meyr., Trans. N.Z. Inst., xvii., 137.)

(Plate XX., fig. 32 ♂.)

This rather small, dull-looking species, has occurred at Wanganui, Masterton and Wellington.

The expansion of the wings is about 1 inch. The fore-wings are pale brownish-ochreous, faintly clouded with grey in the disc; there is an almost straight narrow white streak from the base to the termen above the middle; all the veins are faintly marked in white edged with grey. The hind-wings are very pale brownish-ochreous; the head and a central band on the thorax are dull white.

Somewhat variable in the depth of the ground colour and in the distinctness of the markings on the veins of the fore-wings. Mr. Meyrick remarks that this species is most like *C. callirrhous*, but much duller and greyer, not brassy-tinged, and without the sharply defined white lines of that species; the antennae are whitish, not distinctly dentate in the male, and the termen of the fore-wings is somewhat more sinuate, distinctly dotted with black.

The perfect insect appears in March and April, and frequents grassy places near rivers or on the sea coast. It is attracted by light.

CRAMBUS SIMPLEX.

(*Chilo simplex*, Butl., Proc. Zool. Soc. Lond., 1877, 400, Pl. xliii., 12; *Crambus simplex*, Meyr., Trans. N.Z. Inst., xv., 24.)

(Plate XX., fig. 14 ♂, 15 ♀; Plate II., fig. 34 larva, 35 pupa.)

This rather faintly-marked species has occurred at Napier, Waipukurau, Waiouru and Wellington in the North Island and seems to be common and generally distributed throughout the South Island.

The expansion of the wings is slightly over 1½ inches. The fore-wings of the male are moderately broad with the termen rather strongly oblique; in the female narrower with the apex produced and rather acute; pale ochreous; there is a very slender white streak from the base, close to the costa, broader towards the termen, and in the female broader throughout; the veins are more or less marked in white on the apical portions of the termen; there is a rather narrow, central, longitudinal, white streak from the base to the termen, narrower towards the base and slightly curved towards the termen; there is often a white streak along vein 1 towards the tornus. In the female all

the white markings are more suffused. The hind-wings are very pale whitish-grey in the male, white in the female. The cilia of all the wings are white.

Mr. Meyrick points out that this species "differs from all its allies by the clear pale ochreous ground-colour; the white markings (except the central streak) are more suffused, the cilia clear white, and the hind-wings paler, being quite white in the female. In this and the allied species the central streak appears dark margined in part, but the effect is illusory, and due to the presence of deep folds."

The life-history of this species was discovered, by Mr. R. M. Sunley:—The egg is oval with rather coarse longitudinal striations, pale ochreous, turning light brown three or four days after being laid. It is deposited loosely and probably, in a state of nature, amongst the stems of the tussock grass (*Poa caespitosa*) which constitutes the food of the larva. The young larva is about one-twelfth inch in length, tapering from head to tail. The head and back of the second segment are horny, black and shining; the rest of the body is yellowish-white and glassy-looking, with a brown dorsal line and several series of brown tubercles, each tubercle emitting a hair. It emerges by eating a hole in the egg, but does not eat the entire shell. Immediately after emergence it constructs a silken gallery.

The full-grown larva is slightly over ¾ inch in length stout, the last two segments rapidly tapering. The head is dark brown with black markings; the second segment horny, shining, blackish-grey with black markings; the rest of the body dull greyish-ochreous and glassy-looking, the last segment being yellowish; there are several rows of black tubercles, each tubercle emitting a strong crooked black bristle; there is a dull, pinkish-brown dorsal line and two sub-dorsal lines, the dorsal area between and below these lines is tinged with dull yellow; there is a rather prominent lateral ridge and a deep fold behind the middle of each segment. The larva is sluggish in its habits, spinning much silk and living in galleries composed of silk and refuse situated at the base of the stems of the tussock grass where it is very hard to find. It feeds throughout the late summer, autumn and winter, changing into a pupa in the spring. The pupa is slightly under ½ inch in length, deep ochreous with the principal divisions marked in bright brown; the cremaster is dark-brown, rather elongate and slender. It is enclosed in a rough oval cocoon formed of the old larval gallery. The duration of the pupa state is about one month.

The perfect insect appears from November till March, and usually frequents localities where the tussock grass grows freely. It is common on many of the coast hills near Wellington.

CRAMBUS SIRIELLUS.

(*Crambus sirielus*, Meyr., Trans. N.Z. Inst., xv., 25.)

(Plate XX., fig. 28 ♂.)

This fine species has been taken at Hamilton, Waimarino, Waiouru (2,500 feet), Mount Ruapehu (4,500 feet)

and Kaitoke in the North Island. In the South Island it has occurred on the Tableland of Mount Arthur at elevations between 3,000 and 4,000 feet above the sea-level as well as at Castle Hill, Lake Wakatipu, Fiordland and Seaward Moss, near Invercargill. It is also found on the Chatham Islands.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are dark brown slightly paler towards the costa and dorsum; there is a fine silvery streak on the costa from the base to the apex often narrowly bordered with brown on the costal edge at about $\frac{1}{3}$; a moderately broad central longitudinal silvery streak, considerably narrower towards the base, and slightly narrower towards the termen. The hind-wings are pale brownish-ochreous, darker towards the termen; the cilia of all the wings are dull white. The head, palpi and central portions of the thorax are dull ochreous.

The perfect insect appears from December till March. It is widely distributed, frequenting open swampy situations, but is not a common species.

CRAMBUS APICELLUS.

(*Crambus apicellus*, Z., Mon. Cr., 31; Meyr., Trans. N.Z. Inst., xv., 26.)

(Plate XX., fig. 20 ♂.)

This very distinct and neatly-marked species seems to be generally distributed throughout the country.

The expansion of the wings is about 1 inch. The fore-wings have the costa rather strongly arched, broadly bordered with silvery white from about $\frac{1}{3}$ almost to the apex; this is followed by a dark ochreous-brown longitudinal stripe; at the end of this stripe immediately below the apex there is a minute, triangular silvery mark; there is a rather broad, silvery white central longitudinal stripe finely edged with brown; the rest of the wing is pale brownish-ochreous, shaded with white on the dorsum near the middle; the cilia are grey, narrowly white at the base. The hind-wings are pale greyish-ochreous, darker near the termen; the cilia are pale ochreous.

The perfect insect appears from October till February. It frequents swampy situations and is often found on mountains at elevations of from 2,000 to 3,000 feet above the sea-level. Although widely distributed it is usually very local, and only frequents areas of limited extent.

CRAMBUS PARAXENUS.

(*Crambus paraxenus*, Meyr., Trans. N.Z. Inst., xvii., 137.)

(Plate XX., fig. 17 ♂.)

This local species has occurred at Macetown and Lake Wakatipu at elevations ranging from 2,000 to 4,000 feet above the sea-level.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are narrow, with the costa arched and the termen very oblique; pale brassy ochreous; there is a slightly curved white streak from the base to the termen above the middle; this streak is rather thicker and a little bent at about $\frac{1}{3}$ and its edges are faintly clouded with greyish, especially in the disc; the costal edge is very narrowly edged with white on the apical third, and there is a small white patch on the termen between the apex and the central streak; the cilia are greyish-ochreous barred with white. The hind-wings are pale greyish-ochreous, with white cilia.

The perfect insect appears in November and December and frequents dry slopes on the mountains. Mr. Meyrick points out that this species is "closely allied to *C. vittellus*, with which it agrees in the distinctly barred cilia of the fore-wings, and resembling the most simply-marked forms of that species, but constant; larger, more ochreous-yellowish, not fuscous; the antennae of the male somewhat more slender, the apex of the fore-wings less pointed and the termen not distinctly sinuate, the terminal black dots absent, and the hind-wings greyer, not ochreous tinged." Described and figured from a specimen kindly lent to me by Mr. Philpott.

CRAMBUS ABDITUS.

(*Crambus abditus* Philp., Trans. N.Z. Inst., lv., 212.)

(Plate L., fig. 18 ♀.)

This species was discovered by Mr. C. Lindsay at Otarama, Canterbury.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are elongate with the termen extremely oblique; brassy-ochreous; the costa is narrowly edged with white throughout; there is a broad straight longitudinal white streak from base to termen above middle, but no white margin on dorsum and no white band on the thorax. The hind-wings are white, faintly tinged with ochreous. The cilia of all the wings are white.

The perfect insect appears in October.

CRAMBUS OBSTRUCTUS.

(*Crambus obstructus*, Meyr., Ent. Mo. Mag., 1911, 82.)

(Plate XX., fig. 5 ♂.)

This interesting species was discovered by the late Dr. G. B. Longstaff on March 8th, 1910, three specimens having flown into the train at Lumsden whilst he was passing through that place on a New Zealand tour. It has also occurred on Ben Lomond and in the Routeburn Valley near Lake Wakatipu as well as in other localities in the extreme South, but is not a common species.

The expansion of the wings is slightly over 1 inch. The fore-wings are brownish-ochreous, darker on the costa; there is a white longitudinal streak from the base to the termen above the middle, broken at about $\frac{1}{3}$ by an irregular blackish-brown blotch; the white streak is suffused on the termen, and there is a series of very minute terminal dots. The hind-wings are whitish-ochreous.

The perfect insect appears from January till March and frequents open tussock country. It has probably often been mistaken for the very common and variable *Crambus vittellus*.

CRAMBUS VITTELLUS.

(*Crambus vittellus*, Dbl., Dieff. New Zeal., ii., 289; *Crambus nexalis*, Walk., Cat. xxvii., 178; *Crambus transeissatis*, ibid., 178; *Crambus bisectellus*, Z., Mon. Cramb., 32; *Crambus incrassatellus*, ibid., 32; *Crambus rapidus*, Butl., Proc. Zool. Soc. Lond., 1877, 399; Meyr., T.N.Z. Inst., xv., 27.)

(Plate XX., figs. 2, 3, 4, varieties.)

This species is very common and generally distributed throughout the country. It is also found on the Chatham Islands.

The expansion of the wings is from 1 to 1½ inches. The fore-wings vary from rather dull brown to pale brownish-ochreous, darkest on the costa; there is a very conspicuous longitudinal central stripe of fairly even width, with a very narrow extension towards the apex; the dorsal portion of the wing is more or less clouded with pale ochreous and often tinged with warm brown towards the base, the lower edge of the central white streak being margined with dark brown; there is a very fine, dark brown, terminal line and three or four minute terminal dots below the white longitudinal streak; the cilia are pale brown with three or four slender white bars on apical half. The hind-wings are pale brownish-ochreous, darker towards the apex and termen; the cilia are pale whitish-ochreous.

This species is rather variable. In addition to the variation already indicated, some specimens have two transverse series of more or less confluent dark spots, the first, very oblique, from about $\frac{2}{3}$ of costa to $\frac{1}{2}$ of dorsum, and the second from about $\frac{2}{3}$ of costa to just before the termen; the first series is very strongly angulated above the central streak, the second less strongly angulated; each series is also more or less distinctly indicated on the central streak. Some of the specimens, in which these chains of spots are very distinct, have the costal portion of the wing blackish-brown (fig. 4), whilst others have all the markings much fainter (fig. 2).

The perfect insect appears from December till March, and usually frequents dry grassy situations where it is often very abundant.

CRAMBUS HORISTES.

(*Crambus horistes*, Meyr., Trans. Ent. Soc. Lond., 1902, 276.)

This species is found on the Chatham Islands, where it seems to be quite common.

The expansion of the wings is about 1 inch. Head and thorax pale greyish-ochreous with some white scales. Labial palpi 4, greyish-ochreous, white towards base beneath. Fore-wings with apex tolerably rectangular, termen nearly straight, rather oblique, rounded beneath; pale brownish-ochreous; a rather broad straight snow-white longitudinal streak above middle from base to termen, extremity extended upwards to apex, sometimes yellowish-tinged towards base; costal area above this wholly rather dark brown; cilia pale ochreous suffusedly barred with white. Hind-wings whitish-fuscous; cilia white, with a faint sub-basal whitish-fuscous line.

Allied to *Crambus flexuosellus* (no other species has the sharply contrasted dark costal and light dorsal areas) but easily distinguished by the absence of the characteristic dark spots on lower edge of white streak, and by the hind-wings not being yellowish.

CRAMBUS FLEXUOSELLUS.

(*Crambus flexuosellus*, Dbld., Dieff., New Zealand, ii., 289; Feld., Reis. Nov., Pl. cxxxvii., 32; Meyr., Trans. N.Z. Inst., xv., 28.)

(Plate XX., fig. 31 ♂; Frontispiece, fig. 24 egg.)

Except in the North this species is extremely common and generally distributed throughout the country. It is very common on Stewart Island.

The expansion of the wings is about 1 inch. The fore-wings have the costa rather broadly bordered with chocolate brown,

narrower towards the base; this is followed by a broad, clear white, longitudinal streak, slightly curved upwards at the apex; the rest of the wing is pale brownish-ochreous; there is an elongate brown dot just below the white streak at about $\frac{2}{3}$ and sometimes an obscure wavy brown transverse line at about $\frac{1}{2}$. The hind-wings are pale brownish-ochreous, darker towards the apex. The head, palpi, and thorax are brownish-ochreous.

This species varies considerably in the intensity of the markings, some specimens being much darker than others.

The perfect insect appears from November till April or May. It is certainly one of the commonest species of the genus, and is found almost everywhere. It is often extremely abundant at the edges of forests, or thickets, where countless specimens may sometimes be dislodged by beating.

CRAMBUS TUHUALIS.

(*Crambus tuhualis*, Feld., Reis. Nov., Pl. cxxxvii., 18; *Crambus thrincodes*, Meyr., Trans. N.Z. Inst., xlii., 64; *ibid.*, xliii., 61.)

(Plate XX., fig. 8 ♂.)

This very local species has been taken at Kaitoke near Wellington, on the Dun Mountain near Nelson, and Mount Grey, North Canterbury.

The expansion of the wings is slightly over 1 inch. The fore-wings have a very broad, irregular, white costal band, the dorsal area being pale brownish-ochreous; there is a narrow, chocolate-brown streak on the costal edge becoming broader towards the apex and interrupted by white bars at $\frac{1}{2}$ and $\frac{2}{3}$; several irregular dark brown marks at about $\frac{1}{2}$; a sharp, crescent-shaped brown mark in the disc at $\frac{2}{3}$ enclosing a white spot with a faint brown centre; the second line is white and very jagged; the veins are more or less marked in dark brown. The hind-wings are pale ochreous, slightly darker towards the apex.

There is considerable variation in the extent of the white costal area and in the breadth of the white bars which break through the chocolate-brown costal edging, which may thus be converted into three elongate spots.

The perfect insect appears from December to February, and frequents patches of fern (*Pteridium aquilinum*) growing in openings in the beech forest. It is evidently extremely local. When resting the abdomen and wings are held upwards at an angle of about 15 degrees from the object on which the insect is standing. Mr. Meyrick points out that "this remarkable and very distinct species is intermediate in character between *Crambus flexuosellus*, *vulgaris*, and *cyclopicus*, partaking nearly equally of the characters of all three."

CRAMBUS VULGARIS.

(*Crambus vulgaris*, Butl. Proc. Zool. Soc. Lond., 1877, 400, Pl. xliii., 7.; *Crambus tuhualis*, Meyr., (nec Felder), Trans. N.Z. Inst., xv., 28.)

(Plate XX., fig. 39 ♀.)

This species occurs commonly at Wellington and Christchurch. It is abundant on the Kaikoura Ranges and has been found at Castle Hill at about 2,500 feet above the sea-level, in the Rakaia district, at Wyndham, Lake Waka-

tipu and Dunedin, but is rare at Invercargill. It also occurs on Stewart Island.

The expansion of the wings is barely 1 inch. The fore-wings are ochreous-brown; there is a rather large, elongate, whitish patch on the costa from the base to about $\frac{3}{4}$, often more or less clouded with brown; an irregular whitish patch near the apex, frequently much reduced in extent; *an elongate, oval, white spot a little beyond the middle of the wing edged with dark brown, except towards the dorsum*; there is a wavy transverse white line at about $\frac{3}{4}$ and four or five minute dark brown dots on the termen; the cilia are brownish-ochreous, much darker towards the tornus. The hind-wings are uniform ochreous tinged with brown. The head and thorax are ochreous-brown. Varies considerably in the depth of the brown markings and ground colour.

The perfect insect appears in February, March and April. It is essentially an autumnal species and very frequently enters houses, especially on the approach of winter.

CRAMBUS SOPHRONELLUS.

(*Crambus sophronellus*, Meyr., Trans. N.Z. Inst. xvii., 138.)

(Plate XX., fig. 43 ♂.)

This rather attractive-looking species has occurred at Tapawera, near Nelson, and in Central Otago.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are elongate-triangular, *white, very finely speckled with greyish-ochreous*; there is a greyish-black patch on the dorsum at the base; the costa is broadly tinged with brownish-ochreous, especially towards the base and the veins are clear white; there is a terminal series of black dots and *the cilia are white, very broadly barred with blackish-grey*. The hind-wings are bright ochreous.

This species is very closely allied to *C. cyclopicus* but has shorter wings.

The perfect insect appears in March. It is attracted by light but apparently very rare.

CRAMBUS CYCLOPICUS.

(*Crambus cyclopicus*, Meyr., Trans. N.Z. Inst., xv., 29.)

(Plate XX., fig. 44 ♀.)

This species, which is very closely allied to the preceding, has occurred at Napier, Waipukurau, Wellington, Tapawera (Nelson), Christchurch, Lake Guyon, Wedderburn and Alexandra.

The expansion of the wings is about 1½ inches. The fore-wings are *white, thickly speckled with greyish-ochreous*, the veins being clear white; there is a small blackish-grey patch on the dorsum near the base, followed by two obscure wavy transverse lines extending obliquely upwards but not reaching the costa; *there is a blackish ring with a central dot in the disc; a jagged sub-terminal line and a terminal series of black dots*. The hind-wings are pale ochreous.

This species is very variable and the markings are sometimes very faint or absent. The narrow wings, grey colouring and entire absence of any longitudinal streak are, however, good distinctive characters.

The perfect insect appears in March and April, and is attracted by light. It is very rarely met with in the Wellington District, but is stated to be abundant on the hills around Christchurch.

CRAMBUS SOPHISTES.

(*Crambus sophistes*, Meyr., Trans. Ent. Soc. Lond., 1905, 226.)

(Plate XIX., fig. 24 ♂.)

This distinct, though dull-looking species, was discovered by Mr. J. H. Lewis at Ida Valley, Central Otago.

The expansion of the wings is just over one inch. The fore-wings are *very narrow and elongate dull brownish-grey and glossy*; there are a few obscure blackish markings near the base and a faint transverse shade at about $\frac{3}{4}$, two small black marks near the middle of the wing, a curved series of black dashes on the veins at about $\frac{3}{4}$, and a conspicuous series of elongate black marks on the termen. The hind-wings are pale ochreous.

Several species of *Scoparia*, closely resemble this insect superficially, but may be at once distinguished by the structure of the labial palpi.

CRAMBUS HARPOPHORUS.

(*Crambus harphophorus*, Meyr., Trans. N.Z. Inst., xv., 30.)

(Plate XX., fig. 36 ♂.)

This species is fairly common on the Humboldt Range at the head of Lake Wakatipu, at elevations of from 3,600 to 4,600 feet above the sea-level. It has also occurred on the Tableland of Mt. Arthur at about 4,000 feet and at Arthur's Pass at an elevation of 2,500 feet.

The expansion of the wings is slightly over 1 inch. The fore-wings are pale greyish-ochreous, sometimes slightly tinged with brown, with all the veins towards the dorsum marked in dull white; *there is a slender, white, longitudinal, central streak from the base to about $\frac{3}{4}$; this streak is broken and bent downwards into a hook at about $\frac{3}{4}$; there is a dark brown longitudinal line just below the central white streak, broken into three or four elongate spots near its end, and a curved transverse series of indistinct brownish dots near the termen*. The hind-wings are very pale greyish-ochreous.

There is slight variation, specimens from the far south being darker and greyer than those taken in the Nelson district.

The perfect insect appears in January and frequents grassy places on the mountain sides.

CRAMBUS ONCOBOLUS.

(*Crambus oncobolus*, Meyr., Trans. N.Z. Inst., xvii., 138.)

(Plate XX., fig. 35 ♀.)

This rather unusual-looking species has occurred at Castle Hill at an elevation of about 2,500 feet, especially in the bed of the Porter River, and at New River, near Invercargill.

The expansion of the wings is 1 inch. The fore-wings are rather dark greyish-ochreous; the basal stalk of the median vein and its branches forming veins 2, 3, 4 and 5 are all clearly marked in reddish-ochreous; *there is a conspicuous black and white central stripe extending almost from the base to $\frac{3}{4}$; a short faint black stripe above it near the middle of the disc; the costal and apical veins are faintly marked in white and there are several short black marks between the veins*. Two short stripes consisting of orange, black and whitish lines are situated on each side of the thorax. The hind-wings are dull greyish-ochreous.

The perfect insect appears in December and January, but is rarely met with.

Described and figured from a specimen in Mr. Philpott's collection, which he captured on the coast sandhills.

CRAMBUS XANTHOGRAMMUS.

(*Crambus xanthogrammus*, Meyr., Trans. N.Z. Inst., xv., 32.)

(Plate XX., fig. 6 ♂.)

This interesting species has occurred on the Wairarapa Plain in the North Island. In the South Island it has been taken at Kekerangu (Marlborough), Motueka, Lake Coleridge, Castle Hill, Bealey River, Te Wae Wae Bay, Mace-town, Ida Valley, and at Paradise and the Routeburn Valley, at the head of Lake Wakatipu.

The expansion of the wings is about 1 inch. The fore-wings are silvery white, strongly tinged with blue towards the termen; there is a small irregular dark brownish-grey mark near the base; another at about $\frac{1}{2}$; an interrupted wavy transverse band of the same colour at $\frac{3}{4}$; a second similar band at $\frac{5}{8}$, followed by a much broader band on the termen; the principal veins near the dorsum are broadly marked in dull orange-yellow, and the transverse bands become dull orange-yellow just before they reach the dorsum; the cilia are shining white at the base and dark grey at the apex. The hind-wings are silvery white, shaded with grey at the apex.

The perfect insect appears in January and February. It frequents river-beds and although very local is usually abundant where found. Its flight is rapid, and the markings on the fore-wings are so arranged, that they cause the insect to exactly harmonise in colour with small pebbles in the river-bed. As the moth invariably rests in these situations, with closed wings, it is practically invisible, except when actually flying, and hence its capture is generally attended with some difficulty.

Genus 3.—PROTYPARCHA, Meyr.

Antennae in ♂ unipunctated to apex. Thorax, coxae, and femora, clothed with long loose hairs beneath. Fore-wings with 7 separate, 8 and 9 stalked. Hind-wings with 4 and 5 approximated, 7 connate with 6, anastomosing shortly with 8. (Plate D., figs. 7, 8 neurations of *Protyparcha scaphodes* ♂, fig. 9 head of ditto, fig. 10 antenna of ditto).

At present includes only the following species: A development of *Argyria*.

PROTYPARCHA SCAPHODES.

(*Protyparcha scaphodes*, Meyr., Sub-antarctic Islands of New Zealand, 71.)

(Plate XX., fig. 40 ♂.)

This very sharply marked and interesting little species was discovered at Auckland Island, during the scientific expedition of November, 1907.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the apex somewhat produced and the termen oblique; rather bright brownish-ochreous; there is a conspicuous white dorsal band from near the base to the tornus extending upwards to the apex as a gradually attenuated sub-terminal

streak; a short black mark on the dorsum at the base and a rather broad cloudy black shading in the disc along the edges of the white band; the costal margin is narrowly edged with white to about $\frac{1}{2}$. The hind-wings are grey. The cilia of all the wings are white with a grey basal line.

The perfect insect appears in the middle of November. It frequents the open tussock country on the main island, where it seems to be fairly common. It only flies during hot sunshine, and is very active and inconspicuous.

Genus 4.—ARGYRIA, Hübn.

Antennae in ♂ ciliated. Fore-wings with 7 separate, 8 and 9 stalked. Hind-wings with 4 and 5 connate or stalked, 7 out of 6, anastomosing with 8. (Plate D., figs. 14, 15 Neurations of *Argyria pentadactyla*; figs. 16 head of ditto).

A genus of some extent and wide distribution, but more especially American.

We have two species in New Zealand.

ARGYRIA STROPHAEA.

(*Argyria strophaea*, Meyr., Trans. Ent. Soc. Lond., 1905, 226.)

(Plate XIX., fig. 35 ♀.)

Hitherto this species has only been recorded from Whakarewarewa, Raurimu, Wanganui and Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale grey, very glossy, with strong brassy reflections; there is a very short transverse blackish line at the base bordered on each side with white; the first line is white, oblique, bordered with blackish grey darker towards the termen; the orbicular spot is blackish-grey, the reniform whitish, often rather obscure; the second line is whitish, very oblique, edged with dark grey; the terminal area is more or less clouded with darker grey; there is an obscure wavy sub-terminal line and a series of obscure terminal dots. The hind-wings are pale grey, very glossy, with a broad darker grey terminal shading. The cilia of all the wings are pale grey half barred with dark grey.

The perfect insect appears in January, and usually frequents stony roadside cuttings, especially in the vicinity of forest, but is not at all common. It has a superficial resemblance to *Diptychophora claina*, but is of course considerably larger and darker in colour.

ARGYRIA, PENTADACTYLA.

(*Argyria pentadactyla*, Zell., Mon. Crambs., 38; *Aquila claverella*, Walk., Cat. xxxv., 1765; *Aphomia strigosa*, Butl., Proc. Zool. Soc., Lond., 1877, 398, pl. xliii., 10; *Crambus strigosus*, Meyr., Trans. N.Z. Inst., xv., 31.)

(Plate XX., fig. 48 ♂.)

This large and rather striking looking insect seems to be generally distributed throughout the country.

The expansion of the wings is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. The fore-wings are rather broad with the apex and termen strongly rounded, pale greyish brown with white and blackish-grey markings; there is an irregular black central stripe from the base to about $\frac{1}{2}$ ending in three irregular spots; an extremely jagged black transverse line at about $\frac{3}{4}$ followed by a similar white line; a series of horizontal greyish-brown stripes between these lines and the termen; the veins are indistinctly outlined in white. The hind-wings are pale ochreous, slightly shaded with brown near the apex.

The perfect insect appears from January to March. According to Fereday it was commonly taken at light in Christchurch, and Mr. J. H. Lewis has found it in abundance amongst sedge on Mount Ida, at elevations of from 2,000 to 3,500 feet above the sea-level. It is also common at Paekakariki, near Wellington.

Genus 5.—TAUROSOCOPA, Meyr.

Labial palpi, thorax, and coxae clothed with dense rough hairs beneath. Fore-wings with 7 separate, 8 and 9 stalked. Hind-wings with 4 and 5 stalked, 6 remote from 7 at origin, 7 anastomosing shortly with 8. (Plate D., fig. 22, 23 neurination of *Tauroscopa glaucophanes*; fig. 24 head of ditto.)

An endemic derivative of *Talis*.

The four species comprised in this interesting genus frequent open country on mountains in the South Island at elevations between 4,000 and 5,000 feet above the sea-level. None are known from the North Island at present.

TAUROSOCOPA TRAPEZITIS.

(*Tauroscopa trapezitis*, Meyr., Trans. Ent. Soc. Lond., 1905, 227.)

(Plate XIX., fig. 41 ♂.)

This species was discovered on Mount Earnslaw at an elevation of about 5,300 feet. It has also occurred on Vanguard Peak, near Macetown and on the Takitimu Mountains.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are black with many rather irregular greyish-white markings; there is an oblique stripe near the dorsum at the base; several angulated lines at about $\frac{1}{2}$ enclosing an irregular, black, trapezoidal area; a conspicuous black crescent-shaped spot near the middle of the wing; a curved whitish transverse line at about $\frac{1}{3}$, preceded by a grey patch near the costa, a pale greyish band just before the termen followed by a series of black dots; the veins near the middle of the wing are marked in very dull brownish-grey. The hind-wings are very dark brownish-black.

Mr. Meyrick remarks that "this, the second discovered species of the endemic genus *Tauroscopa*, bears a general resemblance to *T. gorgopis*, but is very distinct, especially by the peculiarly formed first line; whilst the singular naked orange cheeks and orbits are quite a unique feature, of which there is no trace in the other species.

The perfect insect appears from November till February. On one occasion I captured five specimens on the grassy slopes of Mount Earnslaw above Paradise, Lake Wakatipu but, as a general rule, it appears to be a very rare species.

TAUROSOCOPA GORGOPIS.

(*Tauroscopa gorgopis*, Meyr., Trans. N.Z. Inst., xx., 69.)

(Plate XIX., fig. 42 ♀.)

This interesting species has occurred on Mount Arthur, Old Man Range, Cecil Peak, The Remarkables, Advance Peak, and on the Humboldt Range, Lake Wakatipu at elevations of about 5,000 feet.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are dull black, irregularly speckled with white; there are a few

irregular white marks near the base, a very jagged transverse line at about $\frac{1}{3}$, a cloudy blackish shade near the middle of the wing, a very jagged curved white transverse line at about $\frac{1}{2}$ preceded by a whitish patch on the costa, a row of small black dots on the termen. The hind-wings are dark brown.

Specimens from the Old Man Range are smaller and much darker than the typical form.

The perfect insect appears in December, January and February. It is a rare species, frequenting rocky places on high mountains, where it flies with great agility in the hottest sunshine.

TAUROSOCOPA NOTABILIS.

(*Tauroscopa notabilis*, Philp., Trans. N.Z. Inst., liv., 149.)

(Plate L., fig. 19 ♂.)

A single specimen of this species was captured, by the late Augustus Hamilton, on Mount Peel, Nelson. Dr. J. G. Myers has also taken it on the Dun Mountain at an altitude of 3,400 feet.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. Very like *Tauroscopa gorgopis*, from which it differs in the shape of the first line and the absence of small subsidiary angulations in the second line.

The perfect insect appears in December.

Described and figured from the type specimen kindly lent to me by Mr. Philpott.

TAUROSOCOPA GLAUCOPHANES.

(*Tauroscopa glaucophanes*, Meyr., Trans. N.Z. Inst., xxxix., 109.)

(Plate XX., fig. 45 ♂; fig. 46 ♀; Plate XLVIII., fig. 5 ♀ variety.)

This fine species has occurred on the Old Man Range, Vanguard Peak near Macetown, Advance Peak, Takitimu Mountains, Hunter Mountains, Ben Lomond, and the Humboldt Range, Lake Wakatipu, at elevations from 4,000 to 6,000 feet above the sea-level.

The expansion of the wings of the male is $1\frac{1}{4}$ inches, of the female $1\frac{1}{4}$ inches. The fore-wings are rather narrow (broader in the male), oblong, dull bronzy-bluish-green with blackish markings which are very indistinct or absent in the female; the first line is very jagged and extends from $\frac{1}{2}$ of costa to $\frac{1}{2}$ of dorsum; the reniform is elongate, somewhat oblique, broader towards the costa; the second line is indistinct except where it touches the costa and dorsum; there is faint, sub-terminal line, preceded and followed by rather broad pale bands; there is a rather conspicuous pale whitish-ochreous mark on the costa at about $\frac{1}{2}$ and a series of obscure blackish terminal dots. The hind-wings are grey, darker towards the apex and termen, especially in the male. The cilia of all the wings are dark grey, in the hind-wings very slightly tipped with white. In the female the basal area of the fore-wings is distinctly paler than the rest of the wing.

Mr. Philpott remarks that well-defined races of this species occupy different portions of its distributional area. The Wakatipu and Central Otago form is bluish-grey, with the markings fairly distinct; the wings are shorter and broader than in other districts. The Takitimu race is somewhat narrower-winged, and is of a uniform fuscous-brown, the markings being almost obsolete. The Hunter Moun-

tains variety has the greatest wing-expanse, though proportionately narrower than the Wakatipu form; there is considerable admixture of white and ochreous, especially in the female, and the markings are well-defined.*

The perfect insect appears in January and frequents high mountains, flying with great rapidity in the hottest sunshine. It is the largest species of the genus.

Genus 6.—SCENOPLOCA, Meyr.

Labial palpi with hairs of second joint produced beneath into an obliquely projecting tuft. Wings in ♀ much abbreviated, incapable of flight. Fore-wings with 7 separate, 8 and 9 stalked. Hind-wings with 4 and 5 connate, 6 widely remote from 7 at origin, 7 anastomosing with 8.

Also endemic and derived from *Talis*.

Represented by one species only.

SCENOPLOCA PETRAULA.

(*Scenoploca petraula*, Meyr., Trans. N.Z. Inst., xv., 9.)

(Plate XIX., fig. 34 ♂.)

At present this interesting species is only known from the Lyttelton Hills, where it was discovered by Mr. Meyrick in the early eighties. Mr. S. Lindsay has re-discovered it in the same locality.

The expansion of the wings of the male is slightly over $\frac{3}{4}$ inch, of the female about $\frac{1}{2}$ inch. The fore-wings of the male are rather elongate, triangular, with the termen oblique; white with blackish-grey markings and very slightly tinged with ochreous; there is an irregular basal patch; a broad curved band preceding the first line and a narrow band following it; a large irregular discal patch, darker on the costa, surrounding a single, clear white, reniform spot; a conspicuous black sub-apical patch, and two wavy blackish transverse lines, indicating the position of the second line; a series of blackish terminal dots. The hind-wings are pale grey. The female has the fore-wings very narrow oblong and the hind-wings proportionately shorter and rounded; the markings resemble those in the male but are cramped and obscured.

The larva is moderately stout, cylindrical, wrinkled, very sluggish; rather dark greyish-brown on the back, much lighter on the sides; the spots are minute blackish and obscure; the head brown. It feeds beneath a light shelter of silk on lichen dust on rocks, living in a crevice, and issuing forth beneath its shelter to feed.

The perfect insect appears in March and, as the larva occurred in all its stages at the same time, there is probably a succession of broods in the year. Mr. Meyrick states that he found the insect plentifully, sitting on the face of the bare volcanic rock which projects in many places from the soil of the hills near Christchurch; it was reluctant to take wing, perhaps owing to the prevalence of high winds. The female when disturbed ran with considerable activity but was quite incapable of flying.

The figure was taken from a specimen in the Fereday collection.

*Trans. N.Z. Inst., xlix., 217.

Genus 7.—TALIS, Guen.

Fore-wings with 4 and 5 sometimes stalked, 7 separate, 8 and 9 stalked. Hind-wings with 4 and 5 connate, stalked, or seldom coincident, 6 remote from 7 at origin, 7 anastomosing with 8.

An interesting genus, considerably developed in Australia, where it is the principal representative of the family, elsewhere apparently confined to a few widely scattered forms. Their habits are similar to those of *Crambus*.

Only one species is known in New Zealand.

TALIS LEUCOPHTHALMA.

(*Talis leucopthalma*, Meyr., Trans. N.Z. Inst., xv., 7.)

(Plate XXI., fig. 35 ♂.)

This species was discovered by Mr. Meyrick at Christchurch in 1882. It has recently been re-discovered by Mr. S. Lindsay on Mount Grey, North Canterbury.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings, which have the apex acute, are pale brown with darker brown markings; there is an interrupted longitudinal streak at the base; the first line is extremely jagged, paler edged with dark brown; there is a very conspicuous elongate oblique whitish discal mark, edged with dark brown, representing the reniform; the second line, which has numerous fine dentations, is strongly bowed outwards on its upper half, and there is a series of minute terminal dots. The hind-wings are greyish-ochreous, darker on the termen.

The perfect insect was taken in March, and was restricted to one place on the Lyttelton Hills, where it was fairly common. Mr. Lindsay's specimens were captured in November.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

Genus 8.—DIPTYCHOPHORA, Zell.

Fore-wings with termen twice sinuate, 7 separate, 8 and 9 stalked, 11 usually running into 12. Hind-wings with 4 rarely absent (not in New Zealand species), 5 separate, rising from above angle, 6 remote from 7 at origin, 7 anastomosing shortly with 8. (Plate D., fig. 17, 18 neuration of *Diptychophora metallifera*.)

Probably Indo-Malayan in origin, being fairly represented in that region, and less numerously in South Africa, East Australia, and South America; but the New Zealand species still form the largest local group, and include the largest and handsomest species. This very interesting genus includes some of the most beautiful species of *Pyralidae* found in New Zealand, several of them being veritable gems of the insect world. The species are all rather small, with broadly triangular fore-wings, usually elegantly marked, the markings consisting typically of two slender transverse lines, a white or metallic discal spot, and generally three black spots on lower part of termen. Most of the species appear in early summer and frequent damp forests. The rich yellow and orange-brown colouring of many of the species is probably imitative of the hues of fallen leaves, especially those of *Fuchsia excorticata*, which

is usually much in evidence where these insects are found. The larvae feed in moss during the winter and early spring. We have no less than seventeen species in New Zealand. One species is confined to the North Island, two to the South Island, and fourteen common to both islands.

DIPTYCHOPHORA MICRODORA.

(*Diptychophora microdora*, Meyr., Trans. Ent. Soc. Lond., 1905, 227.)

(Plate XIX., fig. 12 ♀.)

At present this little species has been taken in the neighbourhood of Wellington, on Mount Arthur at an elevation of about 3,000 feet, and in the Buller Valley.

The expansion of the wings is just under $\frac{1}{2}$ inch. The fore-wings are very dark purplish-brown, speckled with grey, with strong, bronzy reflections, especially near the termen; there are three golden yellow marks on the costa at $\frac{1}{4}$; a larger golden yellow mark on the dorsum at $\frac{1}{2}$; two minute golden yellow triangular spots on the costa at about $\frac{3}{4}$ and a larger, similar mark, on the dorsum at $\frac{3}{4}$, these two sets of markings being connected by an obscure transverse line; there is a black discal spot containing two minute yellow dots, a few very faint yellowish markings near the termen, and a small yellow mark near the apex. The cilia are purplish-brown with two very obscure whitish bars below the apex. The hind-wings are purplish-grey with the cilia grey.

This species is closely allied to *D. pyrsophanes*, but may be readily distinguished by its smaller size, bright yellow markings and absence of the broad white bars on the cilia of the fore-wings.

The larva, which feeds on dry moss on fallen logs, is very slender, dull brownish-green; the head and second segment are horny, shining brownish-black; there is a double series of obscure tubercles on each segment, each tubercle emitting a black bristle.

The perfect insect appears from the end of November until the middle of January, and frequents forest. Hitherto it has been but rarely met with.

DIPTYCHOPHORA PYRSOPHANES.

(*Diptychophora pyrsophanes*, Meyr., Trans. N.Z. Inst., xv., 11.)

(Plate XIX., fig. 11.)

This distinct little species is common and generally distributed throughout the country. It is extremely abundant at Otira, and has also been found on Stewart Island.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are deep purplish-brown, with strong bronzy reflections; there is an obscure wavy transverse line at about $\frac{1}{4}$ ending in a small somewhat triangular yellowish spot on the dorsum; the second transverse line starts from a larger triangular yellow spot on the costa beyond $\frac{1}{4}$, thence it is very obscure until nearing the dorsum where it ends in two unequal yellow spots; there is a small white or pale yellow spot near the apex; the cilia are rich bronzy brown with two very broad bars of creamy white; there is an obscure black spot above and beyond the middle of the wing. The hind-wings are dark grey with faint purplish reflections; the cilia are also grey.

In South Island specimens the general colouring is usually of a somewhat paler and more slaty hue, and the

yellow markings are slightly smaller. The species also varies slightly in the depth of the ground colour, which is sometimes much paler, also in the extent and number of the smaller yellow markings, these variations often occurring indifferently in specimens from all localities.

The perfect insect appears from the end of November until the end of February. It is often very common in openings in the forest, especially in damp, sunny situations. Owing to its dark colouring and mazy flight it is very difficult to see when on the wing and no doubt often escapes detection. Hence it is probably a much commoner insect than it appears to be.

DIPTYCHOPHORA CHRYSOCHYTA.

(*Diptychophora chrysochyta*, Meyr., Trans. N.Z. Inst., xv., 12.)

(Plate XIX., fig. 10 ♂.)

This insect, which is one of the smallest species of the genus, is generally distributed throughout the country.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are pale brown with several indistinct darker brown transverse markings and a broad pale yellow central band; there is a rather small white spot slightly above the middle of the wing, becoming leaden metallic towards the costa; two elongate horizontal leaden metallic stripes between the central spot and the termen, followed by a curved transverse metallic line; there are three conspicuous black dots on the termen. The hind-wings and abdomen are pale grey.

There is considerable variation in the depth of the ground colouring, and the central band is rarely pale brown instead of yellow.

The perfect insect appears in December and January, and frequents open forest and brushwood. It is rather a scarce species.

DIPTYCHOPHORA INTERRUPTA.

(*Crambus interruptus*, Feld., Reise der Novara, pl. cxxxv., 15;

Diptychophora astroscia, Meyr., Trans. N.Z. Inst., xv., 13;

Diptychophora interrupta, ib. xvii., 130.)

(Plate XIX., fig. 13 ♂.)

This species has occurred at Pipiriki (Wanganui River), Wainuiomata (Wellington), Nelson, Mount Arthur, at about 3,600 feet, Buller River, Christchurch, Akaroa, Arthur's Pass, Lake Wanaka, Ida Valley and Lake Wakatipu, but is nowhere an abundant insect.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are pale brown; there is a large, triangular, white patch at the base, reaching as far as the first transverse line; a very large irregular but somewhat crescentic white mark near the middle; this spot is bounded towards the termen by the second transverse line, which is very strongly curved; there is a pale yellow patch just above the central white spot, four dull, leaden metallic horizontal stripes between the central spot and the termen, and three irregular pale yellow spots near the termen; there are three black dots on the termen before the tornus. The hind-wings are very pale brownish-yellow, finely edged with brown near the apex.

The perfect insect appears in December and January. It frequents shrubby places, generally in river valleys or in mountain ravines.

DIPTYCHOPHORA LEPIDELLA.

(*Diptychophora lepidella*, Walk., Cat., xxxv., 1761; Meyr., Trans. N.Z. Inst., xv., 14; *Crambus gracilis*, Feld., Reis. Nov., Pl. cxxxvii., 26.)

(Plate XIX., figs. 14, 15 ♀ varieties.)

This pretty insect appears to be generally distributed throughout the country. It is rare in the North Island but fairly common in many localities in the South Island.

The expansion of the wings is nearly $\frac{3}{4}$ inch. The fore-wings are pale lemon yellow with golden reflections; the costa is edged with brown near the base; there is a clear white crescentic spot near the middle of the wing; a large cloudy brown patch on the costa beyond the first line and a much smaller patch before the apex; a series of short silvery bars on the second transverse line and three small black dots above the tornus. The hind-wings are grey.

There is considerable variation in the shape and extent of the cloudy brown patches but the white crescentic discal spot is a good distinctive character.

The perfect insect appears in December, January and February. It is usually found amongst low growing bushes, principally veronias, and generally frequents localities situated between 2,000 and 3,000 feet above the sea-level.

DIPTYCHOPHORA LEUCOXANTHA.

(*Diptychophora leucoxantha*, Meyr., Trans. N.Z. Inst., xv., 15.)

(Plate XIX., figs. 16, 17 ♂ varieties.)

This very handsome and conspicuous species is generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rich orange brown; there is a very short transverse line at the base, a double wavy transverse line at $\frac{1}{4}$, a series of rather short horizontal silvery metallic stripes near the termen and three minute black dots on the termen; near the centre of the wing there is a very large snow-white spot, usually edged with brownish-black. The hind-wings are very pale yellowish-white.

A fairly common variety has the central spot pale yellow, and a much rarer variety has the same spot very inconspicuous and dull grey.

The perfect insect appears from the beginning of November until the middle of January. It frequents forests and in some seasons it is common. I have observed that in the South Island it is generally met with in beech forests at elevations of from 1,500 to 2,500 feet above the sea-level. This species rests with the wings drawn backwards and flat forming a triangle; the fore- and intermediate legs are extended and the antennae placed close together along the midback. Its rich orange-brown colouring resembles that of a faded leaf and the same remark applies to both *D. metallifera* and *D. selenaea*.

DIPTYCHOPHORA PLANETOPA.

(*Diptychophora planetopa*, Meyr., Trans. N.Z. Inst., liv., 162.)

(Plate XLIX., fig. 19 ♂.)

This very dark-looking species has occurred in the Routeburn Valley at the head of Lake Wakatipu.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are dull orange ochreous almost entirely overspread with brownish-black scales except on the basal half of the costa; the first line is rather indistinct but on the dorsum it expands into a large irregular triangular white patch; there are two round white spots in the middle of the wing, the lower spot being much the larger; the second line is distinct, whitish, strongly outwards-curved below costa, inwards below middle and slightly outwards before tornus; there is a small white spot at the apex and a series of deep black marks on the dorsum. The hind-wings are blackish-grey.

The perfect insect appears in February and may be looked for amongst forest in the south.

DIPTYCHOPHORA METALLIFERA.

(*Eromene metallifera*, Butl., Proc. Zool. Soc., Lond., 1877, 401, Plate xliii., 11; *Diptychophora metallifera*, Meyr., Trans. N.Z. Inst., xv., 15; xx., 70.)

(Plate XIX., figs. 32, 33 ♀ varieties; Plate III., fig. 1, larva.)

This large and handsome species is fairly common in the vicinity of Wellington. It has also occurred at Auckland, Waimarino, Ohakune, Nelson, Buller River and Otira.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are rich orange-yellow becoming orange-brown towards the termen; there is a brown shade on the costa, a strongly curved transverse line at about $\frac{1}{4}$ and another, very wavy transverse line at about $\frac{3}{4}$; there is a large metallic, crescentic mark in the middle of the wing; four horizontal leaden metallic stripes between the crescent and the termen and two fainter stripes near the tornus; the termen itself is edged with metallic lead colour; there are three minute black dots on the termen before the tornus; the cilia are snow-white, strongly barred with brown. The hind-wings are pale ochreous-yellow with a fine terminal brown line, and occasionally a faint transverse line near the middle. The cilia are white.

In some specimens the whole of the space on the fore-wings between the transverse lines is filled in with rich brown and the costa is broadly margined with brown near the base.

The larva closely resembles that of *D. microdora*, but is stouter, more shining and glassy-looking. It is very active, living in galleries in wet moss, on logs or stones in the forest.

The perfect insect appears from about the second week in November until the middle or end of December. It frequents the banks of streams flowing through dense forest-clad valleys, and is sometimes common in such situations.

DIPTYCHOPHORA SELENAEA.

(*Diptychophora selenaea*, Meyr., Trans. N.Z. Inst., xvii., 131.)

(Plate XIX., fig. 30 ♂.)

This very beautiful little species seems to be generally distributed throughout New Zealand.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are orange yellow, with rich orange-brown markings; there is a very short transverse line at the base, a double angulated transverse line at $\frac{1}{4}$, a double interrupted wavy transverse line at $\frac{3}{4}$, a broad diagonal shaded band extending from slightly below the apex to the dorsum at about $\frac{1}{4}$; there is a small round white spot near the middle of the wing, with an elongate leaden

metallic mark above it; between this and the termen are three horizontal leaden metallic streaks; the termen is finely edged with black, and there are three small black spots just before the tornus; the cilia are golden, barred with brown. The hind-wings are very pale yellow, the termen finely edged with very pale yellowish-brown.

This species varies slightly in the depth and extent of the diagonal shaded band, and apart from its smaller size, it is always readily separated from *D. metallifera* by this character and by the small round white discal spot.

The perfect insect appears from the middle of November until the middle of January, and frequents dense forest, but is not a common insect.

DIPTYCHOPHORA AURISCRIPTELLA.

(*Eromene auriscriptella*, Walk., Brit. Mus. Cat., xxx., 976; *Diptychophora auriscriptella*, Meyr., Trans. N.Z. Inst., xv., 16.)

(Plate XIX., fig. 37 ♀.)

This beautiful little insect is common and generally distributed throughout the country. It also occurs on Stewart Island.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch; of the female $\frac{3}{4}$ inch. The fore-wings are *pale golden yellow, with leaden metallic markings*; there is a conspicuous transverse line at about $\frac{1}{3}$, strongly curved towards the termen in the middle; *an elongate spot above the middle of the wing, leaden metallic towards the costa and white towards the dorsum*; a doubly curved transverse line beyond $\frac{1}{3}$ and two long horizontal stripes between the central spot and the termen; the termen is finely edged with bronzy brown; there are three minute black spots just before the tornus. The hind-wings and abdomen are pale grey. The female is slightly darker in general colouring than the male, but the markings are identical in both sexes.

The transverse lines may sometimes vary in width, as I have a single specimen in which they are very much broader than usual; there is no variation otherwise.

The larva feeds in moss during the winter and early spring.

The perfect insect appears in November, December and January. It frequents the edges of forest, and is often found amongst tree-ferns, or in light brushwood, and is usually commonest in very damp, sunny situations. The freshly-emerged specimens of this species have a most refulgent appearance.

DIPTYCHOPHORA HOLANTHES.

(*Diptychophora holanthes*, Meyr., Trans. N.Z. Inst., xvii., 131.)

(Plate XIX., fig. 36 ♀.)

This bright-looking yellow species has occurred at Wai-nuiomata and the Otira Gorge.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are *bright yellow*; there are two fine, wavy, brown transverse lines at $\frac{1}{3}$ and $\frac{2}{3}$; *two brownish-black dots forming a discal spot* and three small black dots on the termen above the tornus. The hind-wings are grey.

Sometimes the brown transverse lines are almost absent and the position of the second line indicated by a series of short, longitudinal metallic bars. Apart from the very dis-

tinct character of the discal spot, this insect might be mistaken for a plain yellow variety of *Diptychophora lepidella*.

The perfect insect appears in December and January, and frequents mossy places on the edge of forest or scrub. It flies very rapidly in hot sunshine and is an elusive insect to catch. It is evidently a very local species, and apparently attached to places having an exceptionally heavy rainfall.

DIPTYCHOPHORA HARMONICA.

(*Diptychophora harmonica*, Meyr., Trans. N.Z. Inst., xx., 71.)

(Plate XIX., fig. 38 ♀.)

This is one of the most obscurely coloured species of the genus. It has been taken on the Waitakere Ranges near Auckland, Mount Egmont, Waimarino, Palmerston North, Kaitoke and several other localities in the vicinity of Wellington. In the South Island it has occurred at Invercargill and Orepuki.

The expansion of the wings is from $\frac{1}{2}$ to $\frac{3}{4}$ inch. *The fore-wings are pale brownish-grey*; there are two, double wavy transverse lines; *a small round white spot slightly above the middle of the wing with an ill-defined marking above it*; there is often a shading of darker grey towards the termen, a faint silvery line on the termen, an obscure pale mark at the apex, and three minute black dots before the tornus. The hind-wings are pale grey.

This species varies considerably in size and in the intensity of both the ground colour and the markings. Some of the small dark varieties somewhat approach *D. epiphaca* in appearance.

The perfect insect appears in November, December and January, and frequents forest.

DIPTYCHOPHORA BIPUNCTELLA.

(*Eromene bipunctella*, Walk., Cat., xxxv., 1761.)

(Plate LII., fig. 30.)

This species is represented by a specimen in the British Museum.

Size of *Diptychophora auriscriptella*. Fore-wings brown, very neatly marked, markings much as in *D. auriscriptella*, discal spot small, round, white; cilia white except near apex. Hind-wings grey.

Immediately distinguished by the uniform brown fore-wings, small round white discal spot, and grey hind-wings; intermediate between *D. holanthes* and *D. epiphaca*. Locality given as New Zealand without further indication.

I am unacquainted with this species. The above particulars have been supplied by Mr. Meyrick.

A specimen of what is believed to be this species, has recently been captured by Mr. E. S. Gourlay at the Upper Maitai, Nelson, and is figured on Plate LII., fig. 30.

DIPTYCHOPHORA HELIOCTYPA.

(*Diptychophora helioctypa*, Meyr., Trans. N.Z. Inst., xv., 17.)

(Plate XIX., fig. 39 ♀.)

This seems to be a very common species in the extreme South. It occurs abundantly throughout the Lake Wakatipu District and in the neighbourhood of Invercargill.

The expansion of the wings is from $\frac{1}{2}$ to $\frac{5}{8}$ inch. *The fore-wings are rather narrow, pale brownish-ochreous; there is a very jagged transverse line at about $\frac{1}{4}$ and another wavy line at about $\frac{3}{4}$, the space between these two lines being almost filled up with warm brown; there is also a brown patch at the base, a brown shading on the termen and a crescentic white dot near the middle of the wing; there are no metallic markings and scarcely any indentations on the termen. The hind-wings are dark brown.*

This species varies considerably in the extent of the warm brown colouring, which occasionally extends over the entire surface of the fore-wings.

The perfect insect appears in January, and frequents damp grassy open situations, flying actively in the hottest sunshine. I met with it, in extreme abundance, on the grassy flats in the Routeburn Valley, beyond the head of Lake Wakatipu.

DIPTYCHOPHORA EPIPHAEA.

(*Diptychophora epiphaea*, Meyr., Trans. N.Z. Inst., xvii., 132.)

(Plate XIX., fig. 40 ♂.)

This is a mountain species. It has been taken at Mount Egmont, Waimarino, Mount Ruapehu, Mount Arthur, Castle Hill, Arthur's Pass and on the mountains at the head of Lake Wakatipu at elevations ranging from 3,000 to 4,000 feet above the sea-level. It has also been found on Longwood Range and the Hunter Mountains.

The expansion of the wings is barely $\frac{5}{8}$ inch. *The fore-wings are very rich brown, with greenish reflections; the markings are obscure consisting of two slender jagged transverse lines, and a very ill-defined elongate mark above the middle of the wing; the cilia are white, very narrowly blackish close to the termen. The hind-wings are very dark greyish-black; the cilia are dark grey.*

The perfect insect appears in December and January. It frequents very damp spots on mountains, usually near, or slightly above, the upper limit of forest, and, in such situations is sometimes fairly common.

DIPTYCHOPHORA ELAINA.

(*Diptychophora elaina*, Meyr., Trans. N.Z. Inst., xv., 17.)

(Plate XIX., fig. 31 ♀.)

Except in the extreme South this small and very distinct species is common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. *The fore-wings are pale grey slightly ochreous-tinged and finely speckled with blackish, especially near the base and termen, the space between the two transverse lines being usually paler; there is an elongate black spot slightly above the middle of the wing. The hind-wings are pale grey.*

The colouring of this insect is essentially protective, imitating grey lichen-covered rocks or tree trunks. This form of colouring exists in quite a number of species which frequent similar situations such as *Xanthorhoe cinerearia*, *Argyria strophaea*, *Scoparia philerga*, *S. meliturga*, *Izatha convulsella*, etc. The independent acquisition of this type of colouring, by species which are not otherwise allied, is a

very interesting instance of parallel development under similar external conditions.

The life history of this insect was thus described by Fereday:

"The full-grown larva about $\frac{3}{4}$ inch in length, slender, rather flattened, wrinkled, of nearly uniform width, much contracted at the segmental divisions; the ground-colour varying from pale stone to ash-colour; down the middle of the back, on the fifth to the ninth segment inclusive, a series of dark purplish-brown or maroon marks, wedge-shaped, with the point of each wedge cleft, and somewhat resembling a W with the internal space filled up, and having the base of the wedge abutting on the anterior and the cleft end on the posterior extremity of the segment; a cream-coloured tubercular dot at the point of the cleft, and on the base of each dark mark a pair of similar but rather smaller dots; head dark, with a pale longitudinal stripe.

"Feeds on moss on damp walls; when at rest lies stretched out flat on the moss, and entirely exposed; forms in the moss a cocoon covered with dust and moss, hardly distinguishable."*

The perfect insect appears from October till April, and frequents rocky or gravelly situations. It is nearly always found resting on the steep bank of soil, formed by the upturned roots of trees when blown down, and is usually very abundant on the sides of road or railway cuttings, especially if the cutting passes through light bush or scrub. It is attracted by light and frequently enters houses, and is often seen resting on window panes in the day-time. There are probably at least two broods in a season.

DIPTYCHOPHORA PARORMA.

(*Diptychophora parorma*, Meyr., Trans. N.Z. Inst., lv., 202.)

This species has occurred at Waimarino and at Wainuiomata.

It is extremely similar to *Diptychophora elaina* but may be immediately distinguished by the black terminal dots of which there is no trace in *D. elaina*.

The perfect insect appears in December and January. It is found in similar situations to *D. elaina*.

Genus 9.—GADIRA, Walk.

Fore-wings with tufts of scales; 7 separate, 8 and 9 stalked. Hind-wings with 4 and 5 stalked, 6 widely remote from 7 at origin, 7 anastomosing with 8. (Plate D, fig. 19, 20 neuration of *Gadira acerella*; fig. 21 head of ditto.)

Only includes the following species, apparently an early form.

GADIRA ACERELLA.

(*Gadira acerella*, Walk., Cat., xxxv., 1742; *Botys mahanga*, Feld., Reis. Nov., Pl. cxxxvii., 27; *Cryptomima acerella*, Meyr., Trans. N.Z. Inst., xv., 8.)

(Plate XXII., fig. 29 ♀.)

This very distinct species is generally distributed throughout the country.

*Trans. N.Z. Inst., xv., 18.

The expansion of the wings is just under $\frac{1}{2}$ inch. The fore-wings are grey with white markings; the veins are marked in white near the base; there is a double oblique transverse line from beyond the middle of the costa to $\frac{1}{2}$ of the dorsum, a white patch on the costa near the middle, a very conspicuous strongly curved double transverse line near the termen and the termen itself is margined with white; there is a rather large greyish-black spot above the middle of the wing with an oval white dot beneath it. The hind-wings are greyish-white.

The perfect insect appears in December, January and February. It generally frequents lichen-covered rocks and fences, and is much attracted by light. It rests with the fore-wings folded backwards, forming a moderately steep roof, and in this position its raised scales and general colouring cause it to very closely resemble a bird dropping.

Sub-family 4.—PYRAUSTIDES.

Maxillary palpi present. Fore-wings with 7 separate, 8 and 9 stalked. Hind-wings without defined pecten of hairs on lower margin of cell, 4 and 5 closely approximated or stalked, 7 usually out of 6 near origin, anastomosing with 8.

A very large sub-family, mainly characteristic of tropical countries, but in New Zealand very scantily represented, except for the species of the genus *Scoparia*, which by its excessive development almost compensates for all other deficiencies.

The following 12 genera belonging to this sub-family occur in New Zealand:

- | | |
|---------------|------------------|
| 1. NYMPHULA. | 7. NESARCHA. |
| 2. MUSOTIMA. | 8. MECYNA. |
| 3. DIASEMIA. | 9. PROTEROECA. |
| 4. SCELIODES. | 10. HELIOTHELA. |
| 5. PROTERNIA. | 11. SCOPARIA. |
| 6. HYMENIA. | 12. CLEPSICOSMA. |

Genus 1.—NYMPHULA, Schrank.

Antennae $\frac{3}{4}$. Labial palpi ascending; second joint with projecting scales beneath, terminal joint slender, somewhat pointed. Maxillary palpi with apex loosely scaled. Fore-wings with 10 rising out of 8. Tibial outer spurs half inner. (Plate D., figs. 25, 26 Neuration of *Nymphula nitens*; fig. 27, head of ditto).

An Indo-Malayan genus, spreading more or less into surrounding regions. Larva aquatic, sometimes breathing by branchiae. The single New Zealand species is an immigrant from Australia.

NYMPHULA NITENS.

(*Paraponyx nitens*, Butl., Cist. Ent. ii., 556; *Hygraula nitens*, Meyr., Trans. N.Z. Inst., xvii., 130; *Paraponyx nitens*, ib., xx., 63.)

(Plate XIX., fig. 22 ♂.)

This little species appears to be generally distributed throughout New Zealand. It has occurred at Hamilton, Napier, Masterton, Wellington, Christchurch, Lake Wakatipu, Invercargill and the Chatham Islands. It is also found in New South Wales, Victoria and South Australia.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are very narrow near the base with the apex and termen much

rounded; dull brownish-ochreous, often more or less mottled with darker brown; there are wavy whitish transverse lines at $\frac{1}{4}$ and $\frac{3}{4}$; a whitish discal dot margined with brown and a series of small white marks on the termen. The hind-wings are very pale brownish-ochreous with two or three indistinct white bands, the outermost band being broken between the veins.

This insect is stated to be variable in the intensity of its colouring. Australian specimens are sometimes larger and are then usually lighter and more suffusedly marked. The larva is no doubt aquatic. According to Mr. Meyrick the perfect insect appears from November to March, and is generally common in the vicinity of water, besides being often captured at light. I have, however, found it rather a rare species.

Genus 2.—MUSOTIMA, Meyr.

Antennae $\frac{3}{4}$. Labial palpi more or less ascending, second joint with evenly projecting scales beneath, terminal joint slender, rough-scaled beneath towards apex. Maxillary palpi dilated with rough scales, truncate. Tibial spurs long, almost equal. Fore-wings with 10 rising out of 8. Hind-wings with 7 out of cell before angle, separate from 6. (Plate D., figs. 28, 29 neuration of *Musotima nitidalis*; fig. 30 head of ditto.)

Besides the two New Zealand species there are a few others from Australia and the Indo-Malayan region, and one from Brazil.

MUSOTIMA ADUNCALIS.

(*Diathrausta aduncalis*, Feld., Reis. Nov., cxxxv., ii.; *Musotima aduncalis*, Meyr., Trans. Ent. Soc. Lond., 1884, 289.)

(Plate XIX., fig. 19 ♀, 20 ♂.)

This pretty species has occurred at Kaero, Auckland, Wanganui, Wairarapa District, Wellington, Nelson and Christchurch.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are rather broad with the termen deeply indented below the apex pale brown faintly tinged with purple with white markings; the first line is rather obscure; there is an ill-defined white mark on the costa at about $\frac{1}{4}$; two black edged white dots above the middle; a conspicuous white patch, variable in size, with the veins marked in brown followed by a long, curved blackish line; there is a series of blackish-brown marks near the termen. The hind-wings are deeply indented below the apex and before the tornus, white, with the veins and six more or less interrupted wavy transverse lines marked in dark brown. In the female the white markings are replaced by yellow except near the base of the hind-wings and the brown ground colour is paler.

The perfect insect appears from October till February and frequents forest where maiden-hair fern (*Adiantum*) is common. I found it abundant near Pipiriki on the Wanganui River, but it is not generally speaking a common species.

MUSOTIMA NITIDALIS.

(*Isopteryx nitidalis*, Walk., Cat., xxxiv., 1317; *Diathrausta timaralis*, Feld., Reis. Nov., cxxxv., 23; *Musotima nitidalis*, Meyr., Trans. Ent. Soc. Lond., 1884, 290.)

(Plate XIX., fig. 18 ♂; Frontispiece, fig. 22 egg.)

This very neatly-marked little insect is very common and generally distributed throughout the country, and has

also occurred at Stewart Island, Chatham Islands and Auckland Island.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings, which have the termen strongly indented below the apex, vary from pale orange yellow to rich orange brown; there is a small blackish mark on the dorsum near the base; the first line is wavy white, dark margined towards the termen and obscure on the costa; there are two minute white dots above the middle with a short white line on the dorsum below; a conspicuous, broad, crescentic white spot on the costa at about $\frac{1}{4}$, black edged towards the termen; there is a broad oblique brownish shading from the two discal dots to the tornus and between the first line and the short line below the discal dots; there is a fine wavy blackish line near the termen. The hind-wings are pale ochreous, shaded with pale orange-brown towards the termen, with a large black lunule, a shaded black mark near the tornus, a very conspicuous black spot near the middle of the termen and a faint wavy sub-terminal line.

Specimens of this insect from the extreme South, and sometimes elsewhere, are often paler and much duller than usual, being more like *M. aduncalis*, but are always easily distinguished from that species by the markings.

The egg is rather elongate, ribbed, with numerous minute transverse depressions between the ribs, deep red in colour.

The larva, which feeds on *Histiopteris incisa*, is about $\frac{3}{8}$ inch in length, bright green with darker dorsal and lateral lines, very stout, glassy-looking; the skin is considerably wrinkled, the head speckled with black and there is a row of stout black bristles on each segment.

The perfect insect appears from November till March, and it is possible that there is more than one brood in the season. It frequents open forest, or brushwood, where its food-plant is common, and in these situations it is found from the sea-level to about 3,000 feet. The colouring of *M. nitidalis* is highly protective, its orange-brown fore-wings, approximating very closely both in shape and colour to the bright brown, withered, frond tips of the fern on which it rests.

Mr. Meyrick remarks that this species "occurs at Sydney, New South Wales, and Fernshaw, Victoria, and varies principally in depth of colouring, New Zealand specimens being usually darker and more sharply marked than Australian, and slightly smaller. The larva feeds on *Adiantum* (perhaps also on other ferns), sometimes doing much damage in greenhouse plants. Owing to this circumstance it might easily be spread artificially."

Genus 3.—DIASEMIA, Hübn.

Antennae $\frac{3}{4}$ in σ fasciculate-ciliated. Labial palpi porrected, second joint triangularly expanded with dense projecting scales, terminal short, concealed. Maxillary palpi with apex expanded with loose scales. Tibial outer spurs $\frac{1}{2}$ of inner. (Plate D., figs. 44, 45 neurulation of *Diasemia grammalis*; fig. 46 head of ditto.)

A small, widely ranging genus; the New Zealand species is one of a group of representative geographical forms indicating a former single species.

DIASEMIA GRAMMALIS.

(*Diasemia grammalis*, Dblld., Dieff. N.Z. II., 287.)

(Plate XIX., fig. 26 ♀.)

This little species seems to be generally distributed throughout the country, having occurred at quite a number of localities from Hamilton in the North Island to Central Otago in the South Island.

The expansion of the wings is from $\frac{1}{2}$ to $\frac{5}{8}$ inch. The fore-wings, which have the termen very oblique, are dull brown; the dorsal and central area is cream-colour to about $\frac{1}{2}$; there are three short thick black bars on the dorsum and a straight oblique white line from the costa at about $\frac{1}{4}$ not quite reaching the dorsum. The hind-wings are dull-brown with two black-edged whitish bars.

There is considerable variation in the depth of the ground colour, as well as in the extent of the white markings, which in some specimens almost supplant the usual ground colour.

The perfect insect appears from October till March, frequenting dry open localities, and although usually very local is often abundant where found. Mr. Meyrick states this species also occurs in Java, Sumatra and Celebes.

Genus 4.—SCELIODES, Guen.

Forehead with conical prominence. Antennae $\frac{3}{4}$. Labial palpi porrected, second joint with projecting scales beneath, terminal joint exposed, obtuse. Maxillary palpi filiform. Tibial spurs short, nearly equal. (Plate D., fig. 48 head of *Sceliodes cordalis*.)

Besides the following there is a closely allied species from Arabia and Africa.

SCELIODES CORDALIS.

(*Margaritia cordalis*, Dblld., Dieff. N.Z. II., 288; *Sceliodes mucidalis*, Gn., Pyr., 400; *Daraba extensalis*, Walk., Cat., xxxiv., 1311; *Eretria obsistalis*, Snell., Tijds. v. Ent., 1880, 206; ib., 1883, pl. vi., 12; *Sceliodes cordalis*, Meyr., Trans. Ent. Soc. Lond., 1884, 303.)

(Plate XX., fig. 47 ♀; Plate II., fig. 39 larva.)

This species has occurred at Waitomo, Taranaki, Wanganui, Napier, Wainuiomata and Wellington.

The expansion of the wings is about 1 inch. The fore-wings, which have the costa strongly arched and the termen rounded, are pale yellowish-brown very finely speckled with darker brown becoming reddish toward the base; there is a small white mark on the costa at about $\frac{1}{4}$; a curved irregular white band at about $\frac{1}{2}$, often almost reaching to the dorsum; a small triangular white mark on the costa at $\frac{3}{4}$ and a large bright orange-brown patch at the apex, margined with black and white on its basal edge; there are five minute blackish dots on the costa before the apex. The hind-wings are pale ochreous; there is a blackish-brown spot near the middle; an interrupted, wavy brown sub-terminal line and two cloudy patches of pale orange-brown on the termen. Both pairs of wings have a terminal row of minute black dots.

The larva, which feeds inside the green berries of the potato plant (*Solanum aviculare*), is extremely stout, about $\frac{5}{8}$ inch in length, pale red above and ochreous-yellow beneath. The head is brown, the second segment has two large brown horny dorsal plates; the other segments a row

of small horny warts and the anal segment a large horny dorsal plate; the legs and prolegs are short; the body is clothed with a few isolated bristles. This larva is very sluggish and quite helpless when removed from its burrow. About March it is full-grown, when it eats its way out of the berry and spins a small, white, silken cocoon, generally attached to the leaves or the stem of its food-plant. The larva remains in this cocoon, without undergoing any change, until the spring is well advanced, pupation not taking place until the middle or end of October.

The perfect insect appears from December till March, and is sometimes taken at light, but otherwise is rarely met with. When at rest it stands on tip-toe with the apex of the fore-wings touching the ground; the extremities of the palpi, and the curled-back apex of the abdomen being the most elevated portions of the insect.

Mr. Meyrick states that this species has been found at Duaringa, Queensland; Sydney, New South Wales; Mount Lofty Range, South Australia, and also occurs at Celebes.

Genus 5.—PROTERNIA, Meyr.

Forehead with conical prominence. Antennae $\frac{3}{4}$ in δ with a somewhat thickened sinuation at $\frac{3}{4}$, containing a row of projecting scales beneath. Labial palpi porrected, second joint with dense projecting scales beneath, terminal joint almost concealed. Maxillary palpi filiform. Tibial outer spurs half inner. (Plate D., figs. 37, 38 neuration of *Proternia philocapna*; fig. 39 head of ditto.)

Only includes the following species.

PROTERNIA PHILOCAPNA.

(*Proternia philocapna*, Meyr., Trans. Ent. Soc. Lond., 1884, 317.)

(Plate XX., fig. 42 δ .)

This very distinct, though dull-looking insect, has occurred at Whangarei, Auckland, Hamilton, Wellington and Mount Hutt.

The expansion of the wings is just under 1 inch. The fore-wings are triangular, very dull ochreous-brown finely speckled with darker brown; there are several rather obscure, irregular, darker marks on the basal portions of the wing; a conspicuous blackish spot a little beyond the middle just below the costa and a jagged dark transverse line, edged with dull ochreous-white, at about $\frac{1}{4}$. The hind-wings are slightly paler than the fore-wings with two blackish spots near the base and an obscure sub-terminal line. The cilia of all the wings are very pale ochreous, partially barred with dull brown.

The perfect insect appears from November till February. It is usually captured in houses, having been attracted by light, but is not a common species.

Genus 6.—HYMENIA, Hübn.

Antennae $\frac{3}{4}$, basal joint in δ with erect apical spine or scale-projection on inner side, stalk notched above basal joint. Labial palpi arched, ascending, second joint with dense projecting scales beneath, terminal joint moderate, pointed. Maxillary palpi filiform. Tibial spurs nearly equal.

A genus of few species, of which the following is now spread by man throughout the warmer regions of the world.

HYMENIA FASCIALIS.

(*Hymenia fascialis*, Cram., Pap. Exot., 4, pl. 398, f. 0: *recurvalis*, Fab., Ent. Syst., 237.)

(Plate XX., fig. 41.)

This very distinctly-marked species has occurred at Auckland, at Titahi Bay near Wellington, and will probably be found in other localities in the North Island, although, generally speaking, New Zealand is hardly warm enough for it.

The expansion of the wings is about 1 inch. All the wings are very dark brownish-grey, with ochreous reflections and cream-coloured markings; on the fore-wings there is a broad, curved band on the dorsum near the middle, nearly reaching to the costa; a large crescentic spot on the costa at $\frac{3}{4}$ with two minute dots below it; a broad band extends across the hind-wings near the middle, joining the central band on the fore-wings. The cilia are dark brownish-grey with two cream-coloured bars on each wing, the cilia of the hind-wings being broadly tipped with cream colour in addition.

Described and figured from a specimen in Mr. Philpott's collection.

This species occurs also in Australia (as far south as Sydney), and throughout the warmer parts of Asia, Africa and America. The larva feeds on *Cucurbitaceae* (melons, etc.) in gardens. It has no doubt been widely spread by man's agency.

Genus 7.—NESARCHA, Meyr.

Antennae $\frac{3}{4}$. Labial palpi very long, porrected, second joint triangularly expanded with projecting scales, terminal joint concealed. Maxillary palpi dilated with scales towards apex. Tibial outer spurs in δ very short, in ϕ half inner. (Plate D., figs. 40, 41 neuration of *Nesarcha hybrealis*; fig. 42 head of ditto.)

We have one species in New Zealand. A second species is stated by Snellen to occur in Java.

NESARCHA HYBREALIS.

(*Scopula hybrealis* (*hybreasalis*) Walk., Cat., xviii, 797; *Scopula paronalis*, ib., 797; *Adena xanthialis*, ib., xxvii., 198; *Nesarcha hybrealis*, Meyr., Trans. Ent. Soc. Lond., 1884, 330.)

(Plate XXI., fig. 30 δ ; fig. 31 ϕ .)

This large and remarkable-looking species, though nowhere common, is generally distributed throughout the country.

The expansion of the wings is barely 1½ inches. The fore-wings are rather broad with the costa strongly arched before the apex and the termen deeply excavated below the apex, leaving a blunt, rounded projection in the middle. In the male the general colour is dull purplish-brown or dull reddish-brown; the first line is very obscure; there is a conspicuous white mark on the costa near the middle, followed by a very minute spot; the second line is fine wavy dark brown, with three confluent white spots placed upon it near the costa; the terminal area is slightly shaded with darker brown. The hind-wings are ochreous with a sub-terminal line and a dull purplish-brown terminal shading. The cilia of

all the wings are purplish-brown. In the female the fore-wings vary from orange yellow to bright orange brown, or bright reddish-brown; the white markings are all very minute and there are four spots finely outlined in brown inside the second line; the terminal area is sometimes shaded with purple. The hind-wings are bright ochreous, shaded with purple on the termen.

The perfect insect appears from November till March, and is sometimes met with in the winter. It is usually taken on blossoms in the evening, but is not generally a common species. A very dull coloured form, however, occurs rather freely amongst rough herbage on Arthur's Pass at about 3,000 feet above the sea-level. This insect rests with the fore-wings folded flat over the back, hiding the hind-wings; the tip of the abdomen is slightly elevated; the anterior legs sometimes folded up out of use and completely hidden. The moth stands on the hind and intermediate pairs, or on all three pairs, the tips of the tarsi only touching the ground; the antennae are placed close together along the mid-back; the head end is considerably elevated.

Genus 8.—MECYNIA, Steph.

Antennae 3. Labial palpi long or rather long, porrected, second joint triangularly expanded with projecting scales, terminal joint more or less concealed. Maxillary palpi dilated with scales towards apex. Tibial outer spurs half inner. Hind-wings with some loose hairs on and beneath median vein, but without defined pecten. (Plate D, figs. 31, 32 neuration of *Mecynia flavialis*; fig. 33 head of ditto.)

A small genus, of wide distribution. We have seven New Zealand species. Except the first, they are all of South American affinity.

MECYNIA MAORIALIS.

(*Botys maoriatis*, Feld., Reis. Nov., pl. cxxxiv., 34.)

(Plate XXI., fig. 25 ♂; Plate II., fig. 38 larva.)

This pretty species has occurred at Waitakere, near Auckland, and at Pipiriki (Wanganui River). It is extremely abundant at Kekerangu and near Karamea, and has also been found at Lyttelton, Christchurch, Ashburton, Dunedin, Lake Wakatipu, and Invercargill. Although probably abundant in many restricted localities it is certainly not a generally distributed species.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are warm yellowish-brown slightly darker near the base and termen with two faint oblong blackish marks beneath the costa near the middle; the second line is indicated by a curved series of faint dots. The hind-wings are bright orange-yellow with a broad blackish band on the termen becoming fainter and narrower towards the tornus.

The larva of this insect, which feeds on the Kowhai (*Sophora tetraptera*), *S. grandifolia*, Cape broom, common broom and clover, is very handsome. Its general colour is pale green; the head is reddish-brown, the first segment black with three white stripes; there is a conspicuous yellow and white lateral line; two rows of large black tubercles on each segment except the last, generally with two or three

brilliant white centres from each of which fine black bristles arise; there is a double row of clear white spots along the back; the prolegs are greenish with a minute white centred black tubercle above each. The length of the larva when full-grown is about $1\frac{1}{4}$ inches.

The pupa is enclosed in a white silken cocoon, hidden amongst the leaves of the food-plant.

The perfect insect appears from November till March. According to Mr. W. W. Smith it is double brooded, the members of the first brood emerging in November, and those of the second brood about March.

This insect is nearly allied to a group of similar species extending through Europe, the Indo-Malayan region, and Australia, and has formerly been supposed identical with one or other of them, but is now regarded as distinct.

MECYNIA DAICLEALIS.

(*Scopula daiclesalis*, Walk., Cat. xix., 1017; *Mnesictena daiclealis*, Meyr., Trans. N.Z. Inst. xxi., 155.)

(Plate XXI., fig. 23; Plate II., fig. 37 larva.)

This rather bright-looking species has occurred at Kaeo, North of Auckland, Waitakere, Waimarino, Welling-ton and Dunedin.

The expansion of the wings varies from $\frac{3}{4}$ to $\frac{7}{8}$ inch. The head and thorax are bright reddish-brown; the abdomen pinkish-ochreous. The fore-wings are triangular, with the costa strongly arched towards the apex and the termen rather bowed and oblique; bright reddish-brown; the costa is narrowly edged with white from about $\frac{1}{4}$ to $\frac{3}{4}$; the first line is rather indistinct, blackish, not touching margins of wing and often absent; the reniform is sometimes very obscurely indicated; the second line is strongly curved inwards below the middle, broad and blackish-brown or narrow and dark reddish-brown; the dorsum is more or less narrowly bordered with ochreous; the cilia are dark reddish-brown. The hind-wings are bright ochreous-yellow, with a minute blackish discal dot; the cilia are very bright pinkish-red.

The fore-wings vary considerably in colour and are often more or less tinged with grey, which gives the insect a much duller appearance. As already indicated the markings are also frequently indistinct or altogether absent. In some specimens there is an extremely faint grey transverse line half way between the discal dot and the termen.

The larva, which feeds on the Koroniko (*Veronica salicifolia*) is about $\frac{5}{8}$ inch in length, very stout with the segmental divisions deeply excised; pale brownish-ochreous, darker on the back and very glassy-looking; there are two large, irregular, blackish horny plates on the second segment; the third and fourth segments have seven large blackish-brown sub-dorsal warts, six warts being situated on each succeeding segment, except the last two; there are also two or three rows of minute lateral warts.

The pupa is enclosed between two leaves joined together with silk.

The perfect insect appears from December till May. It is certainly a scarce species, but specimens are occasionally taken at light or beaten out of the *Veronica*.

MECYNA NOTATA.

(*Scopula notata*, Butl., Cist. Ent., ii., 493; *Mnesictena notata*, Meyr., Trans. Ent. Soc. Lond., 1884, 330.)

(Plate XLIV., fig. 21 ♂.)

This species is generally distributed throughout the South Island.

The expansion of the wings is slightly under 1 inch. The fore-wings, which are rather narrow and triangular, are *pale reddish-ochreous* clouded with grey on the basal half; the first line is very indistinct; the reniform consists of a somewhat elongate-oblong *clear white spot placed obliquely on the wing, its lower end pointing inwards*, and the whole spot surrounded by a blackish shading; the second line is distinct, finely waved and slightly curved. The hind-wings are pale ochreous with two blackish discal dots. The cilia of all the wings are pale reddish-ochreous.

The perfect insect appears from October till March. It is found on the margins of forests and in certain localities is quite common.

MECYNA ADVERSA.

(*Mecyna adversa*, Philp., Trans. N.Z. Inst., xlix., 243.)

(Plate XXI., fig. 24 ♂.)

This species, which is extremely closely allied to *Mecyna notata*, has occurred at Castle Hill, West Coast Road, and at Queenstown, Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are of a deeper and richer red than in *M. notata* and are also slightly broader with the termen less oblique; the white discal dot is much less oblique, with its lower edge slightly directed outwards. The hind-wings are rather dark ochreous, with a blackish discal dot and a dusky brown basal shading.

The perfect insect appears in January and February, and frequents the edges of beech forests. It is probably often mistaken by collectors for the last species.

MECYNA FLAVIDALIS.

(*Margaritia flavidalis*, Dbl., Dieff. N.Z. ii., 287; *M. quadratis*, ib., 288; *Scopula dipsasalis*, Walk., Cat. xviii., 796; *Botys otagalus*, Feld., Reis. Nov., cxxiv., 35; *Mnesictena flavidalis*, Meyr., Trans. Ent. Soc. Lond., 1884, 330.)

(Plate XXI., fig. 27; fig. 28 variety.)

This variable species is very common and generally distributed throughout the country.

The expansion of the wings ranges from $\frac{1}{2}$ inch to 1 inch. The fore-wings, which are rather broad and triangular, vary from *pale ochreous-brown to bright reddish-brown*, varieties of every intermediate shade being met with; the first line is very faint; *there is a rather pale broad, somewhat quadrangular spot just below the costa near the middle, preceded and followed by a dull brownish shading; the second line is dull brown, very narrow and wavy; there is a terminal series of very slender black marks.* The hind-wings vary from pale to dark ochreous; there are two black discal dots; a wavy sub-terminal line, *a very broad terminal shading at the apex and a terminal series of fine elongate black marks.* In many of the varieties the whole of the hind-wings is more or less sprinkled with black dots.

A rather distinct variety (fig. 28), occurring on the Tararua Range, at an elevation of about 4,000 feet, has

the fore-wings very dull ochreous-brown, often much clouded with dark grey round the discal spot, the spot itself being sometimes very obscure; the other markings are almost obsolete, but the hind-wings have the apical shading considerably darker than usual.

The larva, which feeds on *Muhlenbeckia*, is about $\frac{1}{2}$ inch in length, rather stout, flattened, much attenuated at each end; pale ochreous with two fine whitish lines down the back.

The perfect insect may be met with on mild days almost the whole year through, but is most abundant during the late summer and autumn. It usually frequents the rank grass and other herbage which grows in damp situations and may be often seen, feebly flying, in such places, late in the afternoon, even in the middle of the winter. This species ranges from the sea-level to altitudes of 3,000 or 4,000 feet.

MECYNA PANTHEROPA.

(*Mecyna pantheropa*, Meyr., Trans., Ent. Soc. Lond., 1902, 277.)

(Plate XXI., fig. 29 ♂.)

This very distinct species seems to be fairly common in the Chatham Islands.

The expansion of the wings is about 1 inch. The fore-wings are *orange-yellow; there is a large deep reddish-brown discal patch, its edges being continued to the dorsum as two rather indistinct wavy lines; there is a very distinct jagged second line, strongly looped inwards below the middle and a broad reddish-brown terminal band.* The hind-wings are ochreous, darker towards the termen; there are three brown discal spots and a series of minute, black, terminal dots; the extreme apical and dorsal areas are speckled with brown dots.

Mr. Meyrick states that this species is very variable; it is nearest to *M. flavidalis*, but always without the yellow quadrate spot in the middle of the disc of the fore-wings (always present in *flavidalis*), and also distinguished from both *flavidalis* and *marmarina* by the much longer palpi; readily separated from *notata* by the dark median band and terminal fascia.

Described and figured from a somewhat damaged specimen kindly forwarded by Miss Shand.

MECYNA MARMARINA.

(*Mnesictena marmarina*, Meyr., Trans. Ent. Soc. Lond., 1884, 329.)

Mecyna marmarina, Meyr., Trans. Ent. Soc. Lond., 1902, 276.)

(Plate XXI., fig. 26 ♂.)

This rather dull-looking insect is very common at Kaeo, north of Auckland, in the vicinity of Wellington, and seems to be generally distributed throughout the country. It is also found in the Chatham Islands.

The expansion of the wings is about 1 inch. The fore-wings are broadly triangular, very dull ochreous speckled with blackish-brown, especially near the base and middle; *there is a small white spot below the costa at about $\frac{1}{2}$, a clear white, round spot below the costa near the middle and an obscure wavy brown transverse line near the termen.* The hind-wings are slightly paler than the fore-wings; there are two blackish spots above

the middle, a fine wavy central line and a very broad blackish band on termen from the apex to about $\frac{1}{2}$.

The larva feeds on nettles (*Urtica ferox* and *U. incisa*) as well as on *Australina pusilla*. It lives during the spring and early summer joining two or three leaves together with silken threads and feeding within. Like most Pyralae larvae it has a glassy appearance. Its general colour is dull white, becoming greenish on the dorsal surface. There is a strong clear white sub-dorsal line, and a fainter white lateral line. The head is pale ochreous with a very conspicuous broad brown blotch on each side as well as a few dots of the same colour. The larva is armed with a few black bristles. Its length when full-grown is about $\frac{1}{2}$ inch.

The pupa is enclosed between joined leaves, the insect remaining in this condition for about a month.

The perfect insect appears from October till March, and is usually common wherever its food-plants are found.

Genus 9.—PROTEROECA, Meyr.

Forehead with slight conical prominence. Antennae $\frac{1}{2}$, in $\frac{3}{4}$ fasciculate-ciliated. Labial palpi porrected, clothed with long rough projecting hairs, terminal joint penicillate, partially concealed. Maxillary palpi filiform, apex penicillate. Tibial outer spurs more than half inner. (Plate D., fig. 49 head of *Proteroea comastis*.)

Contains only the following species.

PROTEROECA COMASTIS.

(*Proteroea comastis*, Meyr., Trans. Ent. Soc. Lond., 1884, 335.)

(Plate XIX., fig. 25 δ .)

This rather bright-looking little insect has been taken at Lake Rotoiti (Nelson), Christchurch, Castle Hill, Wedderburn (Central Otago) and New River, near Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are yellowish-brown, becoming dark reddish-brown beyond the second line; the first line is dark reddish-brown, fine wavy and oblique, not touching the costa; the reniform is rather obscure dull grey; between the reniform and the second line there is a much paler band, broader towards the dorsum and not reaching the costa; the second line is very oblique slightly waved dark brown or black, followed by a broad dark brown or blackish shading; there is a broad terminal band of pinkish-brown and a conspicuous series of terminal black dots. The hind-wings are bright yellow, with a fine wavy black central line and a broad blackish terminal shading; there is a terminal series of black dots, the cilia of all the wings are pinkish-brown with a dark brown shading at the base.

Considerable variation exists in the depth of the general colouring, as well as in the extent of the dark markings, thus some specimens appear much darker and duller than others.

The perfect insect appears from October till January, and frequents open country, ascending mountains to about 2,000 feet. It is a rare species.

Genus 10.—HELIOTHELA, Guen.

Antennae less than $\frac{3}{4}$. Labial palpi porrected, second joint with dense projecting scales beneath, longer towards apex, terminal joint exposed, stout. Maxillary palpi not much shorter

than labial, expanded with scales towards apex, truncate. Tibial outer spurs half inner. Hind-wings with lower margin of cell more or less clothed with loose hairs towards base, but without defined pecten. (Plate D., fig. 43 head of *Heliothela erebopis*.)

A small genus of early type, containing at present two European species, one Indian ranging into Australia and Madagasear, three Australian, and one New Zealand species.

HELIOTHELA EREBOPIS.

(*Orosana atra*, Butl., Proc. Zool. Soc. Lond., 1877, 404; *Nyctarcha atra*, Meyr., Trans. N.Z. Inst., xvii, 70; *Heliothela erebopis*, Meyr., Trans. N.Z. Inst., xlv., 41.)

(Plate XIX., fig. 29 \varnothing .)

This little species has occurred on the mountains at Castle Hill and Lake Wakatipu at elevations from 1,200 to 5,000 feet above the sea-level. In the far south it occurs in dry open situations nearer the sea-level.

The expansion of the wings is under $\frac{1}{2}$ inch. The body and fore-wings are dull brownish-black, more or less speckled with white, with very indistinct black markings; there are one or two obscure spots near the base; the first line is slightly angulated; the orbicular is small and distinct, the claviform absent and the reniform 8-shaped, generally very indistinct and separated from the second line by a pale spot; the second line is distinct and very strongly curved inwards below the reniform; the sub-terminal line is absent. The hind-wings are dark brownish-black, paler near the base and costa with a large blackish lunule. The cilia of all the wings are dark grey. On the underside of the fore-wings there are two distinct white spots between the second line and the base and there is a dull white costal blotch on the underside of the hind-wings containing a black lunule. Mr. Meyrick considers that the markings of the under surface indicate the original type.

This insect varies considerably in respect of the distinctness of the pale and dark markings.

The perfect insect appears in December and January. It frequents open grassy or rocky places on mountains, flying in the hottest sunshine, when it is extremely agile and difficult to see. Although usually abundant in the localities it frequents it is not always an easy insect to obtain.

This species was re-named *erebopis* in 1912 in order to avoid confusion with the European *Heliothela atralis*, the type of the genus.

Genus 11.—SCOPARIA, Haw.

Antennae $\frac{3}{4}$. Labial palpi porrected, second joint with long dense projecting scales beneath, longer towards apex, terminal joint exposed. Maxillary palpi rather long, triangularly dilated with scales. Tibial outer spurs half inner. Hind-wings with 4 and 5 connate or stalked. (Plate D., figs. 34, 35 neurulation of *Scoparia yamcuta*; fig. 36 head of ditto.)

A large genus, of world-wide distribution, but nowhere very prominent except in New Zealand and the Hawaiian Islands, in each of which regions it is very numerous developed; in New Zealand it has one hundred and four species, being the largest genus of Lepidoptera, and forming almost a twelfth of the whole lepidopterous fauna, and in the Hawaiian Islands it has about sixty species. Of

the hundred and four known New Zealand species, five are confined to the North Island; fifty-two to the South Island and forty-seven common to both islands. The larvae mostly feed on mosses and lichens, but sometimes on the roots of other plants, and possibly many of the New Zealand species feed on the roots of grass, their habits being similar to those of *Crambus*. The greater number of the New Zealand species are considerably larger and more diversified in appearance than those of other regions; these types are most nearly approached by the few species known from the colder parts of South America, whence others will doubtless be discovered.

The species are quite as varied as numerous. A few are dull-coloured inconspicuous-looking insects whilst many are extremely beautiful. It is essential that all specimens of *Scoparia* intended for study be in the finest possible condition, as in many of the species there is an under layer of neutral tinted scales which, when exposed to view by the removal of the surface scales, completely alters the general appearance of the insect. Unreliable work will therefore inevitably result from descriptions based on indifferent specimens.

SCOPARIA THYRIDIAS.

(*Scoparia thyridias*, Meyr., Trans. Ent. Soc. Lond., 1905, 229.)

(Plate XXII., fig. 36 ♀.)

This interesting species has occurred at Waimarino, Karori and Wainuiomata, near Wellington; Mount Arthur, the Otira Gorge, in the Routeburn Valley, near the head of Lake Wakatipu, and on The Hump, Southland.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dark brownish-black, with dull white markings; the first line is white, moderately broad and distinct; the orbicular and reniform are orange yellow, dark margined; there is an oblong semi-transparent patch between them, plain in the male but obscure in the female; the second line is narrow, strongly curved and slightly oblique; the sub-terminal line is indistinct and much interrupted. The hind-wings are very pale grey, darker towards the termen.

This species varies considerably in the extent of the dark and light colouring, some specimens are very pale, the darker colouring being more or less speckled with white. The specimens I have from the North Island are much darker and browner with the lines narrower, and may possibly prove to belong to a distinct species.

The perfect insect appears in January and February, and frequents forest but seems to be extremely local. It is fairly common in the Routeburn Valley at elevations of from 2,500 to 3,000 feet. Mr. Meyrick remarks that this species "is distinguished from all other New Zealand species by the naked discal patch (possibly not developed in the female); a similar structure is found in certain Hawaiian species, but I think it improbable that they are nearly allied specifically, and regard the character as having been developed independently in each case."

SCOPARIA OREAS.

(*Scoparia oreas*, Meyr., Trans. N.Z. Inst., xvii., 81.)

A single specimen of this species was captured by Mr. Meyrick, near Lake Wakatipu, at an elevation of 5,000 feet above the sea-level.

It is closely allied to *S. philerga*, but stated to be distinguished from that species by the longer and narrower fore-wings, whitish hind-wings; pubescence and longer ciliations of the antennae.

The perfect insect appears in December.

I am unacquainted with this species. The above is taken from the original description.

SCOPARIA PHILERGA.

(*Scoparia philerga*, Meyr., Trans. N.Z. Inst., xvii., 81.)

(Plate XXI., fig. 12 ♀.)

This species is fairly common and generally distributed throughout the country, and has been found in the Chatham Islands.

The expansion of the wings is a little over $\frac{1}{2}$ inch. The fore-wings are, rather narrow, dull white, speckled and obscurely marked with black. There is a short thick black streak at the base, the first line is white, obscurely margined with black towards the termen; the orbicular and claviform form an obscure black patch; the reniform is 8-shaped white margined with black and touching a small black mark on the costa; the second line is white, distinct, edged with black, the terminal space is black except the sub-terminal line, which is frequently broken and often touches the second line near the middle; there is a terminal row of white dots. The hind-wings are pale yellowish-white strongly shaded with grey towards the termen. The cilia of all the wings are dull white with a darker line.

The larva, which feeds in moss during the winter and early spring, is about $\frac{1}{2}$ inch in length, elongate, rather slender with the head reddish-brown and the body dull greyish-green. The second segment has a large horny greenish-black dorsal plate; the third and fourth segments each have a row of small shining greenish-black plates; the other segments, except the last, have two large and two small dorsal plates and three lateral plates, each of which emit fine black bristles.

The perfect insect appears from October till March, and usually frequents forest. When resting on tree trunks, or rocks, its colouring is extremely protective. It is sometimes found on mountains at elevations not exceeding about 4,000 feet.

SCOPARIA MELITURGA.

(*Scoparia meliturga*, Meyr., Trans. Ent. Soc. Lond., 1905, 228.)

(Plate XXII., fig. 12 ♂.)

This is another obscurely marked species and although allied to *Scoparia philerga* is quite distinct from that insect. It has been taken commonly at Auckland, Wanganui, and Wellington, and is probably generally distributed throughout the North Island.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale yellowish-grey; the first line is doubly curved,

very distinct, pale grey, followed by a broad dark grey shading speckled with yellow; the orbicular is 8-shaped, outlined in greyish-black, sometimes indistinct; the second line is dark grey, curved near the costa and oblique towards the termen; there are three ill-defined dark patches on the terminal area, the most conspicuous one being near the apex. The hind-wings are pale grey, darker near the termen.

Of this species Mr. Meyrick remarks "that it is a neater and smoother-looking insect than *Scoparia philerga* and always recognisable by the well-marked yellowish tinge; moreover in *S. philerga* the orbicular is normally white edged with black, and the sub-terminal line is more broadly interrupted."

The perfect insect appears in December and January, and principally frequents rock-facings and the stony sides of road cuttings, especially where mosses and lichens are abundant. It is also often found resting on fences and tree trunks. The moth is common in most localities in the immediate vicinity of Wellington, and is very abundant in the neighbourhood of the Reservoir at Wainui-o-mata. The colouring of this insect closely approximates to that of its surroundings and resembles in general character that of *Diptychophora cluina*, *Xanthorhoe cineraria*, and many other species which frequent similar situations.

SCOPARIA CHLAMYDOTA.

(*Scoparia chlamydata*, Meyr., Trans. N.Z. Inst., xvii., 82.)

(Plate XIX., fig. 28 ♂.)

This species is rather rare in the Wellington District. In the South Island, it has occurred at Arthur's Pass, Dunedin and Invercargill, and is common in the Routeburn Valley, near the head of Lake Wakatipu.

The expansion of the wings is about $\frac{5}{8}$ inch. The fore-wings are warm brownish-ochreous; the basal third and a small triangular apical patch are black, finely sprinkled with grey; the outer edge of the basal patch is obliquely concave, extending from $\frac{1}{2}$ of costa to $\frac{1}{2}$ of dorsum; there is a small ochreous-brown spot in basal patch near base; the sub-terminal area is more or less clouded with warm brown, except near edge of basal patch; there is an irregular brownish terminal line. The hind-wings are greyish-ochreous, with a faint dusky sub-terminal line.

Somewhat variable in depth of colouring.

The perfect insect appears from December till February. It is found in forest to about 3,000 feet above sea-level, but is generally rare. It is, however, quite common in the Routeburn Valley, where it frequents the groves of lace-bark trees (*Gaya Lyallii*), which fringe the edges of the forest near the river.

SCOPARIA TRICLERA.

(*Scoparia triclera*, Meyr., Trans. Ent. Soc. Lond., 1905, 230.)

(Plate XIX., fig. 27 ♀.)

This species has been found near Wellington, but seems to be very rare.

The expansion of the wings is $\frac{1}{2}$ inch. It is very like *S. chlamydata*, from which it differs in its slightly smaller size, dark brown terminal and sub-terminal lines of fore-wings, and dark brown hind-wings.

The perfect insect appears in December and is found in forest.

SCOPARIA HEMIPLACA.

(*Scoparia hemiplaca*, Meyr., Trans. N.Z. Inst., xxi., 155.)

(Plate XXII., fig. 11 ♀.)

This is a rare species and hitherto has only been found at Waimarino, Raurimu, in the neighbourhood of Wellington and at Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are very rich dark brown with faint purplish reflections; there is a large, irregularly oblong, cream-coloured blotch on the dorsum extending from before the middle to the termen and reaching half-way across the wing; its basal portion is rounded and its upper edge slightly indented; it is margined with black and slightly sprinkled with brown scales towards the termen; there is a small cream-coloured spot just below the apex; the reniform and second line are very faintly indicated above the blotch and there is a fine, white, terminal line. The hind-wings are pale grey with a faint sub-terminal line and a dark shade on the termen.

The larva feeds on moss during the winter months.

The perfect insect appears in November, December, and January, and frequents forest, but is rarely met with. Its colouring is imitative of bird droppings, and the resemblance is very close when the insect is resting with closed wings.

SCOPARIA DOCHMIA.

(*Scoparia dochmia*, Meyr., Trans. Ent. Soc. Lond., 1905, 229.)

(Plate XXII., fig. 2 ♂.)

This obscure-looking insect has occurred on the shores of Diamond Lake, near the head of Lake Wakatipu.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dull brownish-grey with a very faint purplish tinge; the first line is white moderately narrow, often indistinct; the orbicular and claviform are blackish and ill-defined; the reniform is y-shaped, somewhat indistinct; the second line is white, fairly broad, moderately curved, oblique, and very conspicuous; the terminal area is browner than the rest of the wing; the sub-terminal line is whitish, ill-defined and often interrupted in the middle and at each end; there are several indistinct blackish dots on the termen near the tornus. The hind-wings are very pale greyish-ochreous with a narrow, darker grey terminal shading.

The perfect insect appears in February. It frequents the bushes of the Wild Irishman (*Discaria toumatou*), so numerous on the open grassy flats above Diamond Lake, and is very common. Most of the specimens seen are so much worn that they are quite unrecognisable, but fresh specimens, although without striking characters, may be at once known and are quite distinct from any of the many other species of the genus.

SCOPARIA MINUSCULALIS.

(*Scoparia minusculalis*, Walk., Cat., 34, 1503; Meyr., Trans. N.Z. Inst., xvii., 82.)

(Plate XXII., fig. 38 ♀.)

This species seems to be generally distributed, though nowhere very common. It has occurred at Kaero, in the far north, on the Tararua Range and at Wellington, Mount

Arthur, Akaroa, Christchurch, Bealey River, Lake Wakatipu, Stewart Island and the Chatham Islands.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are rather elongate, white, with the basal half dark purplish-brown, the edge of the dark colouring being slightly concave; the first line is very obscure, black; the orbicular and claviform also very obscure black, the orbicular being sometimes white-centred; the reniform is white, very faintly outlined in grey; the second line is very distinct blackish-grey on a white ground, the terminal space is brown towards the apex and grey towards the dorsum; there is a very broad white sub-terminal line, broadly broken in the middle, the lower portion connected with the inner white area; the cilia are brownish-grey. The hind-wings are pale ochreous-grey.

The life-history is thus described by Mr. Meyrick: "Larva rather stout, cylindrical, wrinkled, somewhat attenuated towards extremities; light whitish-brown; spots large, round, brassy-fuscous, each containing a black dot; head ochreous brown, second segment dark fuscous. Feeds in moss on tree trunks; pupa in same position; taken in January almost full-grown."

The perfect insect appears from January till April, and frequents forest to about 2,500 feet. The colouring of the fore-wings is evidently imitative of bird-droppings, and must afford the insect efficient protection from enemies when at rest.

SCOPARIA MINUALIS.

(*Scoparia minualis*, Meyr., Trans. N.Z. Inst. xvii., 83.)

(Plate XXII., fig. 37 ♀.)

This species is probably common and generally distributed throughout the country.

The expansion of the wings is barely $\frac{3}{4}$ inch. The fore-wings are somewhat elongate, yellowish-brown with blackish-brown and pale bluish-white markings; there is a brown basal area, darker towards the costa; the first line is white edged with black outwardly; the middle area blackish-brown paler and narrower towards the dorsum; the orbicular and claviform are obscure dark blackish-brown; the reniform is white, clearly edged with black, except towards the costa and dorsum; between the reniform and the second line is a very pale bluish-white blotch; the second line is white margined with black inwardly; the terminal space is brownish-black, much paler towards the dorsum; there is a small pale yellowish patch near the apex and a white patch near the tornus representing the broken ends of a broad sub-terminal line; there is a row of white dots on the termen; the cilia are yellowish-brown, obscurely barred with darker brown. The hind-wings are very pale ochreous-grey with very faint terminal and sub-terminal lines.

This species is distinguished from *S. minusculalis* by the distinct white first line and from *S. chimera* by the white costal spot before the second line.

Specimens from Southern localities are darker and greyer than those from the North, and individuals from the same locality differ slightly in the intensity of their colouring.

The perfect insect appears in December and January, frequenting forest to elevations of about 2,500 feet. It is often fairly common. In general colouration it is clearly imitative of bird-droppings.

SCOPARIA CHIMERIA.

(*Scoparia chimera*, Meyr., Trans. N.Z. Inst., xvii., 84.)

(Plate XXII., fig. 43 ♀; Plate II., fig. 36 larva.)

This rather dull-looking species is common and generally distributed throughout the country.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are pale grey, speckled and mottled with black; the first line is black and fairly distinct; the orbicular and claviform are very obscure, merged in the general black mottling; the reniform is 8-shaped clearly edged with black; the second line is slender and black followed by two rather large black spots, one on the costa and one on the dorsum; between these two spots near the middle of the termen there is a very distinct pale, orange-yellow blotch and near the apex a small whitish spot; there is a terminal row of white dots; the cilia are dark grey. The hind-wings are pale grey, darker towards the termen.

This species may be easily recognised by the orange-yellow spot near the middle of the termen.

During the spring and early summer the larva feeds on moss growing on tree-trunks. It forms long silken galleries amongst the moss in which it lives. The length of the full-grown larva is about $\frac{3}{4}$ inch. It is very stout, rapidly tapering towards the posterior extremity; the head is dark brown and very shining; the second segment black and highly polished; the third and fourth segments have six small, bronzy-black, horny plates and the remaining segments, except the twelfth and thirteenth, ten similar horny plates; the skin between these plates is paler in colour; the twelfth segment has eight plates and the thirteenth has the entire dorsal surface horny. There are a few isolated black bristles.

The pupa is enclosed in a small silken cocoon in the midst of the moss.

The perfect insect appears from December till March. It is fairly common in forest, but does not appear to have been observed at altitudes exceeding about 1,000 feet above the sea-level. Its colouring is highly protective when resting on tree-trunks.

SCOPARIA DINODES.

(*Scoparia dinodes*, Meyr., Trans. N.Z. Inst., xvii., 85.)

(Plate XXII., fig. 3 ♀.)

This species has occurred at Kaco in the far North, Raurimu, Ohakune, Waiouru (2,500 feet), Wellington, Christchurch, Dunedin and Invercargill, and is probably fairly common and generally distributed.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are dark brownish-black spotted and speckled with white; there are several small indistinct black marks at the base; the first line is strongly curved, black, edged with white towards the base, the orbicular and claviform are small, black and very indistinct; before the second line there is a rather irregular, white area containing the reniform which is 8-shaped, clear white, sharply edged with black; the second line is black, wavy, margined with white; the sub-marginal line is represented by two very pale yellow spots, one near the apex, the other near the tornus; there is a row of white dots on the termen; the cilia are dark brownish-black. The hind-wings are grey, darker towards the termen.

This species differs from *S. chimeria* by the absence of the yellow blotch near the termen; from *S. minusalis* by the clear white 8-shaped reniform and from *S. minusculalis* by the much smaller and more broken white markings.

Mr. Meyrick points out that the very short antennal cilia are a good distinctive character.

The larva, which feeds on mosses during the winter and early spring, is about $\frac{1}{2}$ inch in length, cylindrical, slightly tapering at each end. The head and dorsal plate of the second segment are very deep bronzy-black, slightly tinged with green and very highly polished; the rest of the body is pale bronzy-brown tinged with yellowish-green; there are four rows of large highly-polished bronzy-greenish-black tubercles, the two sub-dorsal rows having one large and one small tubercle to each segment; a stout black bristle rises from each tubercle. The larva is very active, tunnelling amongst moss on fallen logs.

The perfect insect appears in December and January, and frequents forest. Its colouring is extremely protective when resting with closed wings on tree-trunks.

SCOPARIA PARMIFERA.

(*Scoparia parmfifera*, Meyr., Sub-antarctic Islands of New Zealand, 72.)

(Plate XXI., fig. 13 ♂.)

This very distinctly-marked species was discovered at Auckland and Campbell Islands during the scientific expedition of November, 1907.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are pale brown; there is a dark blackish-brown oblique basal patch; a very large blackish-brown patch on the costa extending from about $\frac{1}{4}$ to $\frac{3}{4}$ and reaching a little more than half-way across the wing; the first line is oblique and wavy, traversing the basal edge of the large costal patch and meeting the dorsum at about $\frac{1}{2}$; the second line is very fine, wavy and oblique, extending from about $\frac{1}{4}$ of the costa to $\frac{3}{4}$ of the dorsum and not touching the large costal patch; the sub-terminal line is pale yellowish-brown and obscure, the space between it and the second being broadly clouded with dark brown; there is a row of blackish terminal dots. The hind-wings are pale grey, slightly darker near the termen.

A few specimens of the perfect insect occurred in forest at Auckland Island during the latter part of November. It was also found at Campbell Island, at the same time, and was reported to have been the commonest moth there at that season. Mr. Philpott rediscovered it on Longwood Range, Southland, where it was fairly common in the forest, at an elevation of about 2,500 feet above the sea-level,* and Mr. C. E. Clarke has taken it at Waitati, near Dunedin.

SCOPARIA ACHARIS.

(*Scoparia acharis*, Meyr., Trans. N.Z. Inst., xvii., 85.)

(Plate XXI., fig. 14 ♀.)

This fine species has occurred at Kaero, in the far North, Ohakune, Tararua Range, Kaitoke, Wellington, Akaroa, Otira, Dunedin, Lake Wakatipu, and Invercargill.

The expansion of the wings is a little over $\frac{1}{2}$ inch. The fore-wings are pale brown with brownish-black markings; there is a short, thick, oblique spot on the costa at the base, followed

by a rather broad band of the ground colour; a very conspicuous, large, dark brown patch on the costa extending half-way towards the dorsum and much broader on the costa than elsewhere; the basal portion of this patch is bounded by the first line, which is otherwise indistinct; the reniform is double, each spot somewhat oblong; the inner one small, pale brown edged with darker brown; the outer large, conspicuous, dull purplish-grey edged with dark brown; the second line is jagged, dull brown outwardly edged with pale brown; the terminal area of the wing is rich brown with a few short black longitudinal streaks and two small pale marks representing the sub-terminal line.

The egg, which is laid flat in clusters of two or three, is oval, somewhat wafer-like, distinctly flanged, with surface roughened, but without definite sculpture; pale green, with strong iridescent reflections. Length about one-sixtieth of an inch.

The perfect insect appears in November and December, and frequents forest. When alive its colouring is extremely rich, the moth having then a very handsome appearance. Although generally distributed it seems to be a rather scarce species.

SCOPARIA ZOPHOCHLAENA.

(*Scoparia zophochlaena*, Meyr., Trans. N.Z. Inst., liv., 162.)

(Plate XLIX., fig. 3 ♂.)

A single specimen of this rather striking species was taken at Takapuna, near Auckland.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather broad oblong; there is a blackish-brown basal patch, followed by a broad oblique white transverse band containing in its centre an irregular yellowish-brown line; a very large almost black trapezoidal patch is situated on the costa, reaching from about $\frac{1}{4}$ to $\frac{3}{4}$, one of its lower angles touching the dorsum; this patch is broadly and irregularly margined with pure white; the second line is white, finely margined with blackish from costa to near dorsum; it is slightly bent inwards below costa and outwards below this; the sub-terminal area is pale brown with a large black sub-apical blotch and a sub-terminal series of black spots. The hind-wings are white, tinged with ochreous and clouded with grey near apex. The head and palpi are bright yellowish-brown, the thorax blackish-grey and the abdomen pale ochreous. The cilia of all the wings are ochreous-white.

The perfect insect appears in January.

SCOPARIA ANIMOSA.

(*Scoparia animosa*, Meyr., Trans. N.Z. Inst., xlii., 103.)

(Plate XLV., fig. 5 ♂.)

This bright-looking, though obscurely-marked species, has occurred at Wellington and at West Plains and Sandy Point in the Invercargill district.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are orange-brown (darker in southern specimens) with the lines faintly indicated in dull white and margined with brown; there is a large deep brown blotch on the dorsum, filling up the space between the first and second lines and irregularly narrowed towards the disc where it terminates; an oblong semi-transparent spot on the stigmatic region; several dark brown marks on the costa and a series of very small dark and faint terminal spots. The hind-wings are clear pale ochreous in the northern, and pale greyish-ochreous in the southern specimens.

*Trans. N.Z. Inst., xlix., 219.

The perfect insect appears in November and December, and may be looked for in forests. It seems to be extremely rare.

SCOPARIA MOLIFERA.

(*Scoparia molifera*, Meyr., Trans. N.Z. Inst., lvi., 415.)

(Plate LI., fig. 18 ♀.)

This rather bright-looking species was found on the banks of the Manawatu River, near Ashhurst.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The forewings are warm ochreous-brown, becoming much paler on the dorsum; the costa is narrowly margined with blackish; the stigmata are obsolete, but there are several indefinite warm brown markings in disc; the first line is indistinct; the second line pale, running obliquely inwards below costa, then sharply outwards and continued obliquely inwards; the sub-terminal line meets the second line immediately below its first situation, thus leaving a triangular brown terminal patch; a terminal series of black dots. The hind-wings are very pale brownish-ochreous.

The perfect insect appears in February.

SCOPARIA CYMATIAS.

(*Scoparia cymatias*, Meyr., Trans. N.Z. Inst., xvii., 86.)

(Plate XXII., fig. 40 ♀.)

This obscurely-marked species appears to be rare. It has occurred at Mount Arthur, Arthur's Pass and Mount Hutt at elevations of from 2,500 to 4,500 feet, as well as at Queenstown, Lake Monowai, and West Plains near Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate-triangular; pale grey with very faint pinkish reflections thickly sprinkled with black scales; the markings are black; the first line is only clearly indicated on the costa; the orbicular and claviform spots are elongate-oval; the reniform is very distinct 8-shaped with its lower half nearest the termen; the second line is slightly outwards-curved and strongly dentate; there is a wedge-shaped blackish patch on the termen below the apex and a terminal series of black dots. The hind-wings are very pale ochreous, clouded with grey on the termen and with faint grey sub-terminal line and lunule.

The perfect insect appears in December and January.

SCOPARIA MICROPHTHALMA.

(*Scoparia micropthalma*, Meyr., Trans. N.Z. Inst., xvii., 87.)

(Plate L., fig. 8 ♀.)

This species has occurred at Nelson, Christchurch and Lake Wakatipu.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are oblong with the apex rather prominent pale greyish-ochreous very densely speckled with blackish; there is a yellow spot near the base followed by an indistinct pale transverse line; the first line is pale dark-edged strongly waved, especially near the middle; the orbicular and claviform are large, close to the first line, deep yellow; the reniform is large 8-shaped, its upper portion smaller with an indistinct yellow centre, its lower portion being centred with white; the second line is whitish, dark-edged, very strongly outwards curved, almost meeting the sub-terminal line which is strongly inwards-curved; the cilia are pale greyish-ochreous with

a darker line. The hind-wings are blackish-grey; the cilia are grey, tipped with whitish-ochreous.

Distinguished by the ochreous-yellow spots and white dot in reniform.

The perfect insect appears in December and frequents forest.

Described and figured from a specimen kindly submitted by Mr. Philpott.

SCOPARIA HEMICYCLA.

(*Scoparia hemicycla*, Meyr., Trans. N.Z. Inst. xvii., 87.)

(Plate XXII., fig. 7 ♀.)

This remarkable-looking species has occurred on Mount Egmont, Mount Ruapehu and the Taranaki Range in the North Island; and on Mount Arthur, Arthur's Pass, Otira Gorge and the mountains at the head of Lake Wakatipu, in the South Island.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings have the basal two-thirds dark grey, the terminal area being dark brown; there are two short black streaks at the base; a very large semi-circular black mark on the costa extending more than half-way across the wing; there is a very faint grey sub-terminal line. The hind-wings are dark brown, darker towards the termen.

Varies somewhat in size and in the extent of the grey colouring.

This species may be immediately recognised by the large semicircular marking on the costa.

The perfect insect appears in January and February, frequenting mountains, at elevations of from 3,000 to 4,000 feet, and is generally met with at the upper edge of the forest, but is by no means common in such situations. It flies with great rapidity over rocks and stones in the hottest sunshine, and its colouring is protective when resting on rock surfaces.

SCOPARIA XYSMATIAS.

(*Scoparia xysmatias*, Meyr., Trans. N.Z. Inst. xxxix., 110.)

(Plate XXI., fig. 5 ♂.)

This species was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago, at an altitude of 4,000 feet above the sea-level. It has also occurred on Bold Peak at the head of Lake Wakatipu.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dark brown irregularly speckled with yellowish-red except near the margins; there are several indefinite blackish markings on the basal area; the first and second lines are represented by straight, ill-defined series of dull white and yellowish-red scales and are strongly convergent towards the dorsum; there is a small white spot near the middle of the wing followed by a black spot, and a sub-terminal series of black marks. The hind-wings are dark brownish-grey, darker towards the termen; the cilia of all the wings are light brown, darker towards the tips.

The perfect insect appears in February. Mr. Meyrick remarks that the species is probably intermediate between *S. hemicycla* and *S. ergatis*, but very distinct.

SCOPARIA ERGATIS.

(*Scoparia ergatis*, Meyr., Trans. N.Z. Inst. xvii., 88.)

(Plate XXII., fig. 28 ♂.)

This species has occurred at various localities in the neighbourhood of Wellington and at Mount Arthur, Castle Hill, Otira River, Mount Cook, Humboldt Range, Lake Wakatipu and Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are dark brown, slightly bronzy, thickly speckled with grey, with clear dark brown markings; there is a very short oblique mark at the base; the first line is broad and slightly curved; the reniform is very small, oval and obscure; the second line is very broad at the costa and almost straight, edged with grey towards the termen; the terminal area is uniformly dark brown. The hind-wings are dark brown, slightly bronzy, darker towards the termen.

There is considerable variation in the depth of the general colouring and intensity of the markings.

The perfect insect appears from October till January, and frequents dry rocky localities, flying very rapidly in hot sunshine. It is often found on mountains at elevations of about 3,000 feet, but is not confined to such situations. The colouring of the insect is protective when it is resting on rock surfaces.

SCOPARIA AUTOCHROA.

(*Scoparia autochroa*, Meyr., Trans. N.Z. Inst., xxxix., 110.)

(Plate XXI., fig. 16 ♀.)

This distinct, though dull-coloured species, has occurred on the Humboldt Range, Lake Wakatipu, at elevations of from 4,500 to 5,000 feet. It has also been found at Invercargill near the sea-level.

The expansion of the wings is rather less than 1 inch. The fore-wings are broad, dull brownish-grey and almost entirely destitute of markings. The hind-wings are dark greyish-ochreous.

The perfect insect appears in January and February, and usually frequents rocky or grassy slopes on high mountains, but Mr. Philpott informs me that, in the vicinity of Invercargill, it is common in swamps at the sea-level. Its colouring is very protective when resting on the ground, or on rock surfaces.

SCOPARIA CINEFACTA.

(*Scoparia cinefacta*, Philp., Trans. N.Z. Inst., lvi., 391.)

(Plate XLVIII., fig. 7 ♂.)

This very distinct species was discovered by Mr. Philpott, on Gordon's Pyramid, Mount Arthur Range, at an altitude of about 4,000 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. All the wings are dull slaty-grey; the fore-wings are slightly tinged with ochreous, the hind-wings more bluish; on the fore-wings the first line is invisible; the orbicular stigma very minute, round, blackish; the reniform stigma x-shaped, blackish, conspicuous; the second line is represented by a curved series of obscure dusky streaks; there is a series of very faint terminal dots. All the cilia are tinged with ochreous.

In form and general appearance this species is most like *Scoparia autochroa*, but may be readily distinguished by its pronounced slaty-grey colour and peculiar reniform.

The perfect insect appears in January.

Described and figured from a specimen submitted by Mr. Philpott.

SCOPARIA ENCAPNA.

(*Scoparia encapna*, Meyr., Trans. N.Z. Inst. xx., 65.)

(Plate XXII., fig. 6 ♀.)

This rather striking-looking species has occurred on the Mount Arthur Tableland near Nelson at elevations of from 3,800 to 4,000 feet above the sea-level. It has also been found in the Routeburn Valley, at the head of Lake Wakatipu, on the McKinnon Pass near Lake Te Anau, at elevations of about 2,800 feet and at Invercargill near the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The head, thorax and fore-wings are very dark purplish-brown with coppery reflections and a few scattered pale bluish-white scales; the basal area is more densely scattered with whitish scales, especially on the first line; the principal veins are irregularly marked in black; the orbicular and claviform are indistinct; the reniform is obscure, blackish, 8-shaped, followed by a large patch of whitish scales; the second line is somewhat interrupted, pale bluish-white, curved inwards near the dorsum; there is a rather broad irregular patch of pale bluish-white scales near the termen, representing the sub-terminal line. The hind-wings are dark brown, darker near the termen, with dull coppery reflections. The cilia of all the wings are dark brown. The abdomen is dark brown. The legs are blackish-brown banded with white.

The perfect insect appears from November till February, and seems to be very local, frequenting open brushwood near the upper limit of the forest. It flies with great rapidity in the hottest sunshine. Its very dark coloration is probably due to the alpine habitat, but may also afford the insect efficient protection when resting, with closed wings, on blackened rocks. Mr. Philpott has taken it in open swamps near Invercargill.

SCOPARIA LYCHNOPHANES.

(*Scoparia lychnophanes*, Meyr., Trans. N.Z. Inst., lvii., 697.)

(Plate LII., fig. 10 ♀.)

This very dark-looking, stoutly-built species was discovered on Mount Holdsworth, Tararua Range, at an altitude of about 4,000 feet.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are oblong, with the termen almost straight, and the tornus rounded; very dark brown, with obscure blackish markings; the transverse lines are very obscure indicated by a few scattered whitish scales; orbicular and claviform small, black; reniform large, irregularly trapezoidal, dull yellow outlined in blackish. The hind-wings are dark brown, slightly paler than the fore-wings. The cilia of all the wings are dull yellowish-brown.

The perfect insect appears in January, and may be looked for on the open country, above the bush line.

SCOPARIA CRITICA.

(*Scoparia critica*, Meyr., Trans. N.Z. Inst., xvii. 88.)

(Plate XXII., fig. 42 ♂.)

This small, but rather sharply marked species, has occurred at Mount Arthur, Arthur's Pass, Otira Gorge, Ida Valley, Queenstown, and Routeburn Valley, Lake Wakatipu at elevations ranging from 2,000 to 4,000 feet above the sea-level.

The expansion of the wings is about $\frac{5}{8}$ inch. The head, thorax, and forewings are dark brownish black; the head and thorax are sprinkled with white and yellow scales; the fore-wings have most of the veins usually strongly streaked with ochreous-yellow; there is a small white curved mark at the base; the first line is clear, white, almost straight but angulated outwards below the middle; the orbicular and claviform are represented by two ill-defined blackish spots; the reniform is also ill-defined with a white centre above and a yellow centre below, connected with the costa by a dark spot; the second line is very distinct, clear white and inwardly curved towards the dorsum; the sub-terminal line is interrupted, bluish-white near the apex where the ground colour of the wing is darker; there is a fine terminal whitish line; the cilia are black mixed with dull white. The hind-wings, cilia and abdomen are dark grey.

The perfect insect appears in December and January. It usually frequents open scrub on mountain sides, and in such localities is often very common. The colouring of the fore-wings is protective when the insect is resting on blackened or lichen-covered rocks.

SCOPARIA GRACILIS.

(*Scoparia gracilis*, Philp., Trans. N.Z. Inst., lv., 209.)

(Plate L., fig. 27 ♂.)

This delicate-looking insect was discovered by Mr. Philpott on Mount Arthur at an elevation of 4,500 feet.

The expansion of the wings is $\frac{5}{8}$ inch. The fore-wings are narrow, slightly dilated towards the apex; blackish-grey, much paler and browner towards the dorsum; there is an oblique white line from the base to the dorsum at $\frac{1}{3}$; the first line is white, strongly outwards-curved; there are two or three large patches of white scales on the discal area; the second line is strongly outwards-curved near the disc thence becoming obscure; the sub-terminal line is broadly interrupted near the middle; the principal veins are strongly marked in black in the disc and towards termen. The hind-wings are pale-grey.

The perfect insect appears in January.

This species has a considerable superficial resemblance to *Scoparia critica* but is a paler and more narrow-winged insect.

SCOPARIA CHARACTA.

(*Scoparia characta*, Meyr., Trans. N.Z. Inst., xvii., 90.)

(Plate XXII., fig. 4 ♀.)

Although rare, this species appears to be generally distributed. It has occurred at Ohakune, Palmerston North, Makotuku, Wairarapa district, Wellington, Christchurch, Dunedin, Routeburn Valley, Lake Wakatipu, and Invercargill.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are very dark brown with black and cream-coloured mark-

ings; there is a broad oblique blackish band near the base, followed by a yellowish space speckled with dark brown; the first line is cream-coloured edged with black; there is a very large irregular, black edged, pale yellow marking in the middle of the wing, which touches the costa just above the reniform; the lower half of the reniform is represented by a minute pale yellow dot; the rest of the wing is dark brown with a narrow wavy sub-terminal series of black dots. The hind-wings are dull ochreous with a distinct grey central dot and a grey sub-terminal line and terminal shading.

The larva feeds on mosses.

The perfect insect appears from November till March. It is, however, generally observed towards the end of summer and is then usually taken either at sugar, or at light.

SCOPARIA USTIMACULA.

(*Scoparia ustimacula*, Feld., Reis. Nov., pl. cxxxv., 17; Meyr., Trans. N.Z. Inst., xvii., 91; *Scoparia confiera*, Butl., Cist. Ent., ii., 493.)

(Plate XXII., fig. 39 ♂.)

This handsome species has occurred at Kaeo north of Auckland, Wellington, Mount Arthur, Castle Hill, Buller and Otira Rivers, Dunedin, Invercargill and Stewart Island. Although not common it is probably generally distributed throughout the country.

The expansion of the wings is a little over $\frac{1}{2}$ inch. The fore-wings are bright golden-brown and very glossy with dark brown markings edged with white; there is a small brown patch at the base; the first line is very slender, white, faintly edged with brown towards the termen; the orbicular and claviform are very large, touching, dark brown edged with white; the reniform is extremely large and conspicuous, very dark brown edged with white; the second line is white and very slender; the sub-terminal line is broad, white, broken near the middle and rather irregular; there is a terminal series of blackish marks. The hind-wings are pale ochreous, glossy, with a grey discal spot and terminal shading.

The perfect insect appears from September till March or April, and frequents forest, but is seldom common. It is on the wing for a longer period than most species of the genus, and its range extends from the sea-level to elevations of about 3,500 feet.

SCOPARIA PONGALIS.

(*Scoparia pongalis*, Feld., Reis. Nov., pl. cxxxvii., 33; Meyr., Trans. N.Z. Inst., xvii., 91.)

(Plate XXII., fig. 1 ♀.)

This neatly-marked little species has occurred at Auckland, Makotuku, Tararua Range, Wellington, Christchurch, Dunedin and Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are pale greyish-brown, much darker beyond the second line; there is a very conspicuous, elongate, triangular, dark brownish-black mark on the costa, extending from the base to about $\frac{2}{3}$; the reniform is partially outlined in black; the second line is dark grey, obscure, and merged with the very broad terminal shading; there is a series of minute black terminal dots. The hind-wings are ochreous-grey, slightly darker on the termen.

The perfect insect appears from December till March, and frequents forest, but is rarely met with. This species

rests with the wings closed over the back; the fore-legs placed forwards, the other legs hidden; the antennae held backwards along the midback and the palpi and head erect. The dark brown mark on the costa is connected by means of a fine line with the eye, the sides of the palpi are coloured to match, and together constitute a striking peculiarity, which probably has some significance when the insect is resting. A lichen-covered twig, or a splotch of bird-dropping on a twig, or possibly a curled dead leaf may be aimed at.

SCOPARIA MELANAEGIS.

(*Scoparia melanaegis*, Meyr., Trans. N.Z. Inst. xvii., 92.)

(Plate XXI., fig. 51 ♀.)

This species has occurred on Mount Egmont in the North Island and at Arthur's Pass and Lake Wakatipu in the South Island at elevations of from 1,000 to about 4,200 feet above the sea-level.

The expansion of the wings is almost 1 inch. The fore-wings are rather elongate, dark blackish brown with white markings; the first line is broad and oblique; the dorsum is narrowly edged with white; there is an almost straight clear white line a little before the second line; the second line is strongly curved running into, and slightly passing the straight line, a little before the dorsum, these two lines enclosing a space which perhaps represents the reniform; the sub-terminal line is broad, wavy, and rather diffused almost touching the second line in the middle. The hind-wings are very pale greyish-ochreous with a dusky sub-terminal line. *This species is readily distinguished by the very large, almost black blotch on the costa which nearly reaches to the dorsum.*

The perfect insect appears in December and January, and frequents mountainous districts, generally occurring in rocky localities, either in the forest, or in sheltered spots above it, and is sometimes fairly common in such situations.

SCOPARIA TRAPEZOPHORA.

(*Scoparia trapezophora*, Meyr., Trans. N.Z. Inst., xvii., 93.)

(Plate XXI., fig. 50, ♂.)

This species has occurred at Mount Arthur, Castle Hill, and Mount Aurum, at elevations of about 3,000 feet.

The expansion of the wings is just over 1 inch. It differs from *S. melanaegis* in the following respects: *The fore-wings are much narrower; the white border on the dorsum considerably broader; the first line more slender and more oblique; the terminal edge of the large, central, blackish patch strongly curved inwards away from the termen; and the terminal area beyond the second line much paler.*

The perfect insect appears in January and frequents wooded valleys high on the mountain sides. It is apparently a very rare species.

SCOPARIA PHILETAERA.

(*Scoparia philetaera*, Meyr., Trans. N.Z. Inst., xvii., 93.)

This species was described from a single specimen taken by Mr. Meyrick at Bealey River.

The expansion of the wings of the male is about $\frac{3}{4}$ inch. The fore-wings are white, irregularly mixed with light grey, with

a few fine scattered black scales; a suffused blackish spot on costa at base; first line strong, white, blackish-margined, somewhat curved, hardly indented; bent more obliquely outwards on dorsum, followed by a cloudy, blackish, triangular spot on costa; costa dark fuscous from first line to three-fifths, a rather darker grey suffusion extending from this to reniform and claviform; orbicular small, round, obscure, black margined; claviform elongate, cloudy, black, touching first line; reniform 8-shaped, black margined, upper half grey, lower clear white; second line strong, whitish, anteriorly dark-margined forming a small blackish spot on costa; terminal space grey, veins suffused with black; sub-terminal line cloudy, whitish, somewhat interrupted, not touching second line; cilia whitish, with two dark grey lines. Hind-wings very pale whitish-grey, lunule, postmedian line and termen hardly darker, cilia whitish with two grey lines.

Recognisable by the rather broad distinct lines, dark suffusion towards costa, and clear white lower half of reniform.

The perfect insect appears in January.

I am unacquainted with this species. The above is taken from the original description.

SCOPARIA GALACTALIS.

(*Scoparia galactalis*, Huds., Ent. Mo. Mag. 1913, 250.)

(Plate XXI., fig. 46 ♂.)

This very beautiful species was discovered in the Routeburn Valley near the head of Lake Wakatipu. It has also occurred at Skipper's Creek, at Waitati as well as on the Takitimu Mountains, where Mr. Philpott states it is fairly common at elevations between 2,000 and 3,000 feet.

The expansion of the wings is $\frac{3}{4}$ inch. *The fore-wings are creamy-white with blackish-brown markings; there is a small basal patch on the costa and an irregular spot below it; the first line is strongly concave towards the base, very broad on the costa, with a faint brown shading towards the termen and dorsum; there is an elongate mark on the costa near the middle; the reniform is often very indistinct; the second line is very distinct, slightly wavy, oblique, with a rounded projection towards the termen above the middle; there are four large pale brown spots on the terminal area, the two lower spots being confluent; the cilia are cream-coloured with a double series of brown bars. The hind-wings are greyish-ochreous with faint lunule and terminal shading.*

This insect rather closely resembles some of the paler forms of the next species. It differs, however, in its narrower fore-wings, clear white ground colour of thorax and fore-wings, less sinuate second line, absence of distinct orbicular and claviform, and more irregular and usual obsolescent reniform.

The perfect insect appears in January, and frequents forest. The colouring of the fore-wings no doubt affords the insect efficient protection by its general resemblance to bird-droppings.

SCOPARIA LOCULARIS.

(*Scoparia locularis*, Meyr., Trans. N.Z. Inst., xlii., 118.)

(Plate XXI., fig. 15 ♂.)

This pretty species has occurred at Mount Arthur, and in the Routeburn Valley at the head of Lake Wakatipu, at elevations between 2,000 and 3,500 feet above the sea-level.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are rather broad, creamy white or greyish-cream colour, with black and yellowish-grey markings; a few irregular black marks at base with heavy sprinkling of yellowish scales; the first line is very distinct, black, with angulation outwards above middle; orbicular and claviform heavily outlined in black; a broad sprinkling of black and yellowish scales beyond first line, especially towards dorsum; reniform 8-shaped clearly outlined in black with cloudy suffusion above it on costa; second line black, with two strong sinuations below costa, slightly dentate towards dorsum; a broad, irregular yellowish suffusion beyond second line, the veins thereon marked in black; a black blotch on termen above middle, the rest of terminal area cream-coloured. The hind-wings are pale grey, with a wavy darker sub-terminal line.

Somewhat variable in ground colour and intensity of markings.

The perfect insect appears in January and February, and frequents scrubby forest on the mountain sides.

SCOPARIA TORODES.

(*Scoparia torodes*, Meyr., Trans. Ent. Soc. Lond., 1901, 568.)

This species was discovered at Mount Cook by Fereday.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are white; there is a dark fuscous basal fascia from costa, reaching half across wing; basal area up to first line mixed with ochreous and dark fuscous; lines white, remote, first curved, edged posteriorly by an irregular streak of fuscous and dark fuscous scales, strongest towards costa; second twice sinuate, edged anteriorly by a strong dark fuscous streak; orbicular and claviform small, roundish, dark fuscous, confluent with dark margin of first line; an X-shaped dark fuscous discal mark, anteriorly touching a cloudy triangular dark fuscous spot on costa beyond middle; terminal area beyond second line dark fuscous, with a broad, irregular white sub-terminal line confluent in middle with second line and slightly interrupted above this; cilia whitish with two cloudy dark fuscous lines. Hind-wings light grey, cilia whitish with two grey lines.

The perfect insect appears in February.

I am unacquainted with this species. The above has been taken from the original description.

SCOPARIA TRISCCELIS.

(*Scoparia triscelis*, Meyr., Sub-antarctic Islands of New Zealand, 71.)

(Plate XXI., fig. 4 ♀.)

This very clearly-marked species was discovered at Auckland Island during the scientific expedition of November, 1907. It has since been found on Mount Egmont, in the Routeburn Valley near Lake Wakatipu, and on the Hunter Mountains and Longwood Range.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate triangular, pale brownish-ochreous very thickly speckled with blackish brown scales except on the veins; the first line is dull white, very oblique and nearly straight; the orbicular and claviform are very distinct almost wholly brownish-ochreous; the reniform very large, brownish-ochreous with an irregularly triangular centre of blackish scales; there is an oblong white patch between the orbicular and the reniform; the second line is very oblique, waved above the middle; the sub-terminal line very deeply indented and broken in the middle; there is a fine, white,

terminal line. The hind-wings are pale greyish-ochreous with a faint grey lunule and a cloudy line beyond the middle.

The perfect insect was taken during the last ten days of November, frequenting dense rata forests. It appeared to be fairly common and occurred on the shores of Carnley Harbour and Norman's Inlet at Auckland Island. In February, 1911, it was rediscovered in dense forest on the steep sides of the left branch of the Routeburn.

SCOPARIA PERIPHANES.

(*Scoparia periphanes*, Meyr., Trans. N.Z. Inst., xvii., 94.)

(Plate XXI., fig. 3 ♀.)

Although rare this pretty species seems to be generally distributed. It has occurred at Whangarei, Waitakere, Auckland, Waimarino, Wellington, Motueka, Lake Wakatipu and Invercargill.

The expansion of the wings is not quite $\frac{3}{4}$ inch. The fore-wings are very pale yellow; there is a thick black oblique line on the costa close to the base almost touching the dorsum and surrounded with a brownish shading; the first line is very conspicuous, straight, black, oblique, followed by a very broad, brown shading reaching half-way to the second line; the reniform consists of two small brown dots; the second line is faint, wavy, pale brown, not reaching the dorsum; there is a large, irregular, somewhat crescentic, black mark below the apex and a smaller but somewhat similar mark at the tornus; there is also a series of terminal black dots. The hind-wings are pale grey with a faint sub-terminal line and terminal shading.

The perfect insect appears in December and January, but is rarely met with in the North Island. It is attracted by light and is occasionally taken resting on windows. Mr. Philpott states that it is common in swampy bush near Invercargill.

SCOPARIA COLPOTA.

(*Scoparia colpota*, Meyr., Trans. N.Z. Inst., xx., 65.)

(Plate XXI., fig. 1 ♂.)

This species is fairly common at Wellington and has also occurred at Christchurch, Dunedin and Lake Wakatipu.

The expansion of the wings is not quite $\frac{3}{4}$ inch. Apart from its somewhat smaller size this species differs from *S. periphanes* in the following respects: The general ground colour is slightly tinged with bluish-grey; the first line is less oblique; the second line slender, black, quite distinctly marked from the costa to the termen and strongly curved, especially just above the middle; the conspicuous black markings near the apex and tornus are replaced by a general dark grey mottling on the terminal area.

The perfect insect appears in December, January and February, and often enters houses, having no doubt been attracted by the lights at night.

SCOPARIA CHORISTIS.

(*Scoparia choristis*, Meyr., Trans. N.Z. Inst. xxxix., 111.)

(Plate XXI., fig. 2 ♀.)

This species has occurred at Waimarino, Ohakune, Kaitoke, and Wellington in the North Island, and on the Dun Mountain, Lake Wakatipu and Invercargill in the South Island.

The expansion of the wings varies from slightly under to slightly over $\frac{1}{2}$ inch. It differs from *S. colpota* in the following respects: the termen of the fore-wings is slightly more oblique; the general colouring is considerably duller; the reniform spot is clearly 8-shaped; the average size is larger and the hind-wings and terminal area of the fore-wings darker, especially in the female. It is also very closely allied to *S. periphancs* but differs from that species in the absence of the characteristic pale yellow ground colour of the fore-wings and in the shape of the reniform spot.

The perfect insect appears from November till January. It is fairly common in the forest at Kaitoke, though usually difficult to obtain in good condition. It may eventually prove to be only a local form of *S. colpota*, although at present this does not seem likely.

SCOPARIA PHALERIAS.

(*Scoparia phalerias*, Meyr., Trans. Ent. Soc. Lond., 1905, 230.)

(Plate XXI, fig. 6 ♀.)

This very rare insect has been taken at Kaitoke and Wainuiomata near Wellington. It has also occurred at the Upper Maitai, Nelson, on the Tableland of Mount Arthur at an elevation of about 3,400 feet, at Waitati near Dunedin, on Ben Lomond, Lake Wakatipu, and at the Bluff.

The expansion of the wings of the female is about $\frac{3}{4}$ inch. The fore-wings are rather elongate with the termen oblique, rounded above the tornus, very dark blackish-brown finely sprinkled with bluish-white scales; there is a large patch of yellowish-brown on the costa from $\frac{1}{4}$ to a little more than $\frac{1}{2}$ and reaching nearly half across the wing; the claviform is round and the reniform small, somewhat kidney-shaped, both pale ochreous-brown; the cilia are bright ochreous-brown. The hind-wings are rather pointed towards the apex, greyish-ochreous, glossy, shaded with darker grey towards the termen. The male is slightly larger in size, with the fore-wings almost wholly dark yellowish-brown; there is a fine whitish second line, strongly bent outwards below the costa.

The perfect insect appears in November, December and January, frequenting forest, but is very rarely met with. Mr. Philpott states that specimens taken at the Bluff, near the sea-level, are much smaller than those from the mountains, although otherwise identical.

SCOPARIA DIPHTHERALIS.

(*Scoparia diphtheralis*, Walk., Cat., xxxiv., 1501; Meyr., Trans. N.Z. Inst., xvii., 94.)

(Plate XXI, fig. 20 ♂.)

This fine species seems to be fairly common, and is probably generally distributed throughout the country.

The expansion of the wings is 1 inch. The fore-wings are black with white markings and several longitudinal yellowish streaks on the veins; the first line is white, very broad, partially divided towards the dorsum; the orbicular is round, black-edged, with a white or pale yellow centre; the claviform is also black, less distinct and seldom pale centred; the reniform is 8-shaped, black with the two centres pale yellow or white; the spaces on each side of the reniform are generally strongly prismatic like mother of pearl; the second line is broad, white, edged with black; the sub-terminal area is black and the sub-terminal line

broad, often touching the second line above the middle, where it is sometimes broken; there is a terminal row of white dots. The hind-wings are dull ochreous with lunule, sub-terminal line, and terminal shading dull grey.

The perfect insect appears from December till March. It is nearly always captured at lamps, generally in the neighbourhood of forest, and individuals so taken are almost invariably females. A paler insect, without distinct prismatic markings, occurs at Lake Wakatipu and is, I believe, only a local variety of this species.

SCOPARIA SUBMARGINALIS.

(*Hypochaetia submarginalis*, Walk., Cat., xxvii. 48; *Nephoteryx maoriella*, ib., 35, 1720; ? *linealis*, Walk., Cat., xxxiv., 1503; *Scoparia submarginalis*, Meyr., Trans. N.Z. Inst., xvii., 95.)

(Plate XXI, figs. 7, 8, 9 varieties.)

This pretty species was formerly extremely abundant throughout the country, but of late years it has greatly decreased in numbers, though it is still very plentiful in some localities far removed from settlement. It is common on Stewart Island.

The expansion of the wings is about 1 inch. The fore-wings are pale brown or greyish-brown with the markings very variable both in colour and intensity; there is a small patch of the ground colour at the base; the first line is double, wavy, oblique, extending away from the base towards the dorsum, the space between the double line is sometimes wholly white, sometimes partly filled in with dark brown; the orbicular and claviform are obscure, cloudy, dark brownish-black; the reniform is also obscure, very imperfectly margined with black; none of the spots have pale centres; the second line is always distinct, white, wavy below the costa, sloping inwards towards the dorsum and traversing a rather conspicuous bright orange-brown spot just before it reaches the dorsum; the sub-terminal line is very broad, grey, broken in the middle; there is generally a terminal series of blackish dots. The hind-wings are greyish-ochreous very strongly shaded with dark greyish-brown on the termen, especially near the apex.

This species is very variable. Sometimes the space between the first and second lines is entirely filled in with uniform rich brown. One of the commonest and prettiest varieties is dappled with rich blackish-brown, the dappling extending more or less over the whole of the fore-wings, except on the first and second lines. A third variety has all the markings indistinct, except the second line, and is strongly speckled with grey throughout. It thus somewhat resembles *S. indistinctalis* except for the bright orange-brown patch near the lower end of the second line, which in this variety is very conspicuous. This insect becomes worn soon after emergence and, unless a specimen is in good condition, it is quite impossible to identify it. There appears to be a lower layer of neutral tinted scales, which give worn specimens quite a distinctive appearance, as though they belonged to a different species.

The perfect insect appears from November till March. It is most abundant throughout January and the first half of February, but after this rapidly decreases in numbers. It usually frequents forest at fairly low levels, resting in great numbers on fences, trees, rock faces, etc., where it

used to be a perfect pest to the collector. When so resting its colouring is very protective, but it is a very timid insect, taking wing on the slightest provocation and flying with considerable rapidity.

SCOPARIA CATAXESTA.

(*Scoparia cataxesta*, Meyr., Trans. N.Z. Inst. xvii., 96.)

(Plate XXI, fig. 19 ♂.)

This species has occurred at Wanganui River, Manawatu River, Mount Arthur, Otira Gorge, Castle Hill, Lake Guyon, and Lake Wakatipu, and is probably common in many restricted spots throughout the country.

The expansion of the wings is a little over 1 inch. *The forewings are rather elongate, dark slaty grey, often strongly tinged with blue, especially in fresh specimens; there are only the faintest traces of the first and second lines and the reniform which are paler grey. The hind-wings are pale ochreous-grey, a little darker near the termen.*

The perfect insect appears from November till March and frequents bare shingle, or rocks, usually in the bed of a mountain stream, but sometimes on the higher slopes up to about 4,000 feet. When at rest it is extremely hard to see as its colouring so closely harmonises with its surroundings. If disturbed it takes flight with great rapidity, flying fast for a short distance, close to the ground, and quickly settling again.

SCOPARIA ASALEUTA.

(*Scoparia asaleuta*, Meyr., Trans. N.Z. Inst. xxxix., 111.)

(Plate XXI, fig. 17 ♂.)

This very pretty species has occurred at Lake Wakatipu, Lake Manapouri, and occasionally at Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. *The forewings are pale blue, somewhat iridescent with blackish-blue markings; the basal patch is ill-defined rather broad; the first line almost straight, connected with the orbicular and claviform, both of which are moderately large and somewhat indefinite in shape; the reniform is 8-shaped; the second line is very fine wavy with a cloudy patch on the costa; the terminal area is more or less clouded with pale blue with an elongate blackish-blue patch near the tornus; a very cloudy, irregular sub-terminal line and a terminal series of blackish dots; the cilia are grey. The hind-wings are pale greyish-white with a darker grey shaded terminal band; the cilia are white.*

Slightly variable in the extent and intensity of the blackish-blue markings.

The perfect insect appears in January. It frequents the shingle beach around the north-western shore of Lake Wakatipu. When resting with closed wings its colouring harmonises very perfectly with the stones, and this renders its detection a difficult matter. It is only on the wing for a very short period, and this, coupled with its very efficient means of protection, probably accounts for the insect's apparent rarity.

SCOPARIA TETRACYCLA.

(*Scoparia tetracycla*, Meyr., Trans. N.Z. Inst. xvii., 97.)

(Plate XXI, fig. 21 ♀.)

This species has been taken at the Anatore River near Nelson, at Christchurch and at Lake Coleridge.

The expansion of the wings is slightly under 1 inch. *The head, thorax and forewings are dull ochreous-grey, densely speckled with black and white scales; the first line is white, rather wavy, slightly outwards-curved towards the dorsum; the orbicular and claviform are dull white, margined with black; the reniform is 8-shaped, white, obscurely margined with black, with a whitish patch on the costa above it; the second line is curved outwards below the costa and inwards above the dorsum, white, rather broad and irregularly margined with black; the sub-terminal line is rather obscure, white, touching the second line above the middle; there is a fine interrupted terminal white line; the cilia are dull white, barred with dark grey. The hind-wings and abdomen are dull greyish-ochreous; the termen is clouded with darker grey, the cilia are dull white with a greyish line.*

The perfect insect appears in February and March but is by no means a common species. It seems to frequent open stony, or sandy situations.

SCOPARIA GYROTOMA.

(*Scoparia gyrotoma*, Meyr., Trans. N.Z. Inst. xli., 7.)

(Plate XXI, fig. 18 ♂.)

This rather obscure species has occurred at Ida Valley, Alexandra South, and at Lake Tekapo.

The expansion of the wings is $\frac{3}{4}$ inch. *The forewings are very narrow with the termen rather oblique, dull greyish-white, more or less speckled with dull brown and coppery scales, with blackish markings; there is an obscure, cloudy basal mark; the first line is very distinct, oblique, slightly indented near the middle; the orbicular and claviform are elongate, large, touching each other and the first line; the reniform is ill-defined, 8-shaped, touching the second line; the second line is rather oblique followed by a cloudy dull whitish band; the terminal area is blackish with a very obscure paler sub-terminal line. The hind-wings are very pale greyish-white, darker towards the costa and termen. The cilia of all the wings are white.*

The perfect insect appears in November and December. It was captured flying over the stony shores of Lake Tekapo in hot sunshine.

SCOPARIA INDISTINCTALIS.

(*Hypochalcia indistinctalis*, Walk., Cat. 27, 48; *Scoparia rakaisensis*, Knaggs, Ent. Mo. Mag., iv., 80; *Scoparia indistinctalis*, Meyr., Trans. N.Z. Inst. xvii., 97.)

(Plate XXI, fig. 10 ♂.)

This species has occurred at Tokaanu, Wairakei, Wellington, Christchurch, Castle Hill, Dunedin, Lake Wakatipu, Lake Monowai, Invercargill, and Chatham Islands. It is probably very generally distributed. Formerly it was quite abundant, but of late years it has become comparatively rare.

The expansion of the wings is about $\frac{3}{4}$ inch. *The forewings are very pale grey speckled and marked with blackish-brown; the first line is strongly angulated outwards near the middle and*

followed by a distinct, darker shading; the orbicular is obscure; the reniform distinct, 8-shaped and placed obliquely on the wing; the second line is pale, strongly curved, followed by a very conspicuous dark patch at the tornus, a much fainter patch on the middle of the termen and a very small, obscure patch at the apex; there is a series of obscure blackish terminal dots. The hind-wings are very pale greyish-ochreous with a broad, dark grey, terminal shading.

Slight variation exists in the intensity of the markings.

The perfect insect appears from December till February. It is usually found at rest on rocks, fences, or tree-trunks and its general colouring is highly protective in such situations. The rapid decrease in the numbers of this insect, during comparatively recent years, is no doubt due to the extension of settlement and some of the introduced birds may, perhaps, be the primary cause of its destruction.

SCOPARIA BISINUALIS, n. sp.

(Plate XXI., fig. 45 ♀.)

This rather scarce species has occurred at Ohakune, on the lower slopes of Mount Holdsworth, Taranaki Range, at Wellington and at Ashburton.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are pale bluish-grey, faintly speckled with black; there is a narrow, doubly waved, longitudinal black streak starting near the costa at about $\frac{1}{3}$ and reaching the termen considerably below the apex; the reniform appears as a rounded notch beneath the middle of this line; there are several wedge-shaped blackish marks on the termen; the cilia are ochreous-grey, barred with blackish. The hind-wings are greyish-ochreous, darker towards the apex; there is a very faint cloudy sub-terminal line; the cilia are ochreous with a greyish line.

Varies considerably in depth of colouring and in the extent of the blackish speckling on fore-wings. Easily known by the characteristic longitudinal black streak of fore-wings.

The larva feeds on mosses.

The perfect insect appears from December till February.

For very many years this species was incorrectly identified as *Scoparia harpalea*.

SCOPARIA CHALICODES.

(*Scoparia chalicodes*, Meyr., Trans. N.Z. Inst., xvii., 98; *Scoparia ciserodes*, Meyr., ib., lii., 30.)

(Plate XXII. fig. 13 ♀.)

This small grey species has occurred at Wanganui, Napier, Christchurch, Mount Hutt and Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate, grey, with numerous interrupted longitudinal black streaks, a heavier and longer streak being situated on the termen below the apex. The hind-wings are very pale whitish-ochreous, faintly clouded with grey at the apex and with obscure cloudy grey terminal and sub-terminal lines.

Appears to be variable, as in the original description both first and second lines and stigmata are mentioned as obscurely indicated, but they are absent in the specimen in the Fereday collection, from which the figure and description given in this work were prepared.

The perfect insect appears from January till March.

SCOPARIA PSAMMITTIS.

(*Scoparia psammittis*, Meyr., Trans. N.Z. Inst., xvii., 99.)

(Plate XXIV., fig. 51 ♂.)

This very obscure-looking species has been taken at Auckland, Mount Ruapehu, Mount Holdsworth, Mount Arthur (4,000 feet), Arthur's Pass (4,500 feet), Dunedin, Invercargill and at the head of Lake Wakatipu.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are very narrow, pale grey, with blackish-grey markings; the first line is rather broad, ill-defined, and very oblique; the claviform generally very distinct black, not pale centred; the orbicular and reniform are dark grey, pale centred; the second line is wavy, oblique, whitish-edged with grey and marked with dark grey dots where it crosses the veins; the sub-terminal line is very broad, ill-defined, dark grey, interrupted in the middle; there is a terminal series of blackish dots. The hind-wings are ochreous-grey with obscure darker grey lunule, sub-terminal line and terminal shading.

Some specimens of this insect are more ochreous-tinged than others and the claviform spot varies considerably in intensity.

The perfect insect appears from September till April.

SCOPARIA LEPTALEA.

(*Scoparia leptalea*, Meyr., Trans. N.Z. Inst., xvii., 98; *Scoparia leptophaea*, Meyr., Trans. Ent. Soc. Lond., 1902, 277.)

This species has occurred at Hamilton, Napier, Masterton, Wellington and Christchurch, and is probably fairly common and generally distributed throughout the country. It has also occurred on the Chatham Islands. It very closely resembles *Scoparia psammittis*, from which it differs in its smaller size, stouter antennae of the male with shorter antennal ciliations and less conspicuous claviform spot.

The perfect insect appears from October till March, frequenting dry grassy places, and is often taken at light.

SCOPARIA FIMBRIATA.

(*Scoparia fimbriata*, Philp., Trans. N.Z. Inst., xlix., 243.)

(Plate XLV., fig. 3 ♂.)

This remarkable species was discovered by Mr. Philpott on Mount Cleughearn, Hunter Mountains, at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The antennae of the male are moderately bipectinated. The fore-wings are reddish-brown, much paler on the central area and towards the tornus; the first line is broad, slightly curved, deep reddish-brown on the costa, becoming blackish before the middle; the second line is fine, blackish, strongly outwards bowed near the middle and acutely dentate below the middle; there is an 8-shaped discal dot marked in blackish- and reddish-brown. The hind-wings are pale ochreous.

The perfect insect appears in December and frequents sub-alpine forests. It has a striking superficial resemblance to *Scoparia epicomia*, but may be at once recognised by the antennal pectinations in the male.

Described and figured from a specimen in Mr. Philpott's collection.

SCOPARIA EPICOMIA.

(*Scoparia epicomia*, Meyr., Trans. N.Z. Inst., xvii., 99.)

(Plate XXI., fig. 33 ♀.)

This rather striking species is generally distributed throughout the country. It is also found at Auckland Island and in the Kermadec Islands.

The expansion of the wings is about $\frac{3}{4}$ inch. *The head, thorax, and basal portion of the fore-wings as far as the first line are orange-brown; the first line is pale yellowish-brown and very narrow; beyond this there is an irregular band of rich reddish-brown, narrower towards the costa and dorsum; the central area is pale bluish-grey, darker towards the base; there is a conspicuous, reddish-brown triangular mark on the costa above the reniform; the second line is slender, pale yellowish-brown, slightly curved and dark margined; beyond this there is a narrow band of reddish-brown; the terminal area is bluish-black; there is a black blotch at the tornus and a series of black terminal dots. The hind-wings are ochreous-grey with a darker grey lunule, a wavy sub-terminal line, and a terminal shading. The abdomen is pale ochreous-brown.*

This species varies considerably in size, in the general intensity of the markings and in the extent of the bright reddish-brown markings. Northern specimens are usually brighter than southern examples.

The perfect insect appears from October till March. It frequents forest and is generally found in very damp, overgrown situations, mostly in deep forest ravines, but is not a common species. It has occurred in localities from the sea-level to altitudes of about 3,800 feet.

SCOPARIA FERE DAYI.

(*Scoparia feredayi*, Knaggs, Ent. Mo. Mag., iv., 80; Meyr., Trans. N.Z. Inst., xvii., 100; *Scoparia moanalis*, Feld., Reis. Nov., pl. cxxxvii., 34.)

(Plate XXI., fig. 34 ♂.)

Although generally distributed, this is not a common species. It has occurred at quite a number of localities, from Waimarino in the centre of the North Island southwards to Invercargill.

The expansion of the wings of the male is slightly under $\frac{3}{4}$ inch, of the female $\frac{3}{4}$ inch. *The fore-wings are reddish-brown; the basal area is slightly speckled with white; the first line is dull white, not oblique, slightly angulated above the middle; the central area is bright reddish-brown, the reniform is obscure dark brown; the second line is white, slightly oblique, waved before the dorsum; the terminal area is greyish-white, slightly speckled with reddish-brown. The hind-wings are pale ochreous with a cloudy sub-terminal line and terminal shading.*

Apart from its much smaller size, the female differs in the absence of the bluish terminal area from the fore-wings, the duller and more uniform ground colour, and the general indistinctness of the markings.

The perfect insect appears from October till March, frequenting the outskirts of forest to elevations of about 3,000 feet.

Of this species Mr. Meyrick remarks that "as Butler has quoted the name as a synonym of *S. submarginalis*, it may be worth while stating that there is not the least resemblance between the two species." Mr. Philpott points

out that the female often has short and narrow wings, and is an example of the tendency towards an apterous condition in the female not uncommon in New Zealand Lepidoptera.*

SCOPARIA VULPECULA.

(*Scoparia vulpecula*, Meyr., Trans. N.Z. Inst., lviii., 697.)

(Plate XXI., fig. 32 ♀.)

This species has occurred on Bold Peak at the head of Lake Wakatipu.

The expansion of the wings is nearly $\frac{3}{4}$ inch. *The fore-wings are elongate-oblong, with the apex acute and the termen rather oblique; dull brown, slightly bronzy; a conspicuous darker spot in disc beyond middle, and a very faint sub-terminal line; the cilia are dull brown. The hind-wings, which have the apex acute and a distinct sinuation below apex, are dull ochreous-brown with a dusky terminal shading; the cilia are dull ochreous-brown.*

The perfect insect appears in January.

SCOPARIA ACOMPA.

(*Scoparia acoma*, Meyr., Trans. N.Z. Inst., xvii., 100.)

(Plate XLV., fig. 6 ♂.)

This very obscure-looking species has occurred in the South Island around Lake Wakatipu and on the Hunter Mountains at elevations ranging from about 1,200 to 2,500 feet.

The expansion of the wings is about $\frac{3}{4}$ inch. *The fore-wings are rather narrow with the apex pointed and the termen rather oblique; pale ochreous-brown and very glossy, darker towards the base and on the costa; the markings are very indistinct; the reniform is rather large, 8-shaped, dull white; the second line whitish wavy, bowed outwards near the middle; the termen is clouded with dark brown and there is a series of indistinct whitish terminal dots. The hind-wings are very pale brownish-ochreous with a dusky lunule and sub-terminal line.*

The perfect insect appears in December and January and frequents forests.

SCOPARIA CYPTASTIS.

(*Scoparia cyptastis*, Meyr., Trans. N.Z. Inst., xli., 7.)

(Plate XXII., fig. 30 ♂.)

This rather obscure species has occurred commonly at Seaward Moss, near Invercargill, at Wyndham, on Longwood Range and on Stewart Island.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. *The head and thorax are brownish-grey, more or less speckled with white. The fore-wings are dull bronzy-grey, speckled with white, darker in the female; the veins are more or less streaked with blackish-brown; the first line is white, broad, curved, and slightly oblique; the second line is also white, broad, slightly curved and indented below the costa; the orbicular and claviform are rather obscure dark brown or black; the reniform is X-shaped, also dark brown or black; the sub-terminal line is white, very irregular, continuous and not touching the second line; there is a terminal series of blackish marks on the veins; the cilia are grey with dark basal and paler median lines. The hind-wings are*

*Trans. N.Z. Inst., xlix., 221.

very pale yellowish-white tinged with pale brown near the termen; the cilia are pale yellowish-white with two grey lines. The female is smaller and considerably darker in colour than the male.

The perfect insect appears from October till February, and frequents open swampy situations. The hill form from Longwood Range (2,700 feet) is generally larger but does not differ in any other respect.*

SCOPARIA ILLOTA.

(*Scoparia illota*, Philp., Trans. N.Z. Inst., II., 224.)

(Plate XX., fig. 12 ♂.)

This rather dark-looking species, which was discovered by Mr. Philpott, has occurred at Waimarino in the North Island, at Waitati near Dunedin, Lake Wakatipu and from Blue Cliffs to Knife-and-Steel Boat Harbour, Fiord County, in the South Island.

The expansion of the wings is about $\frac{3}{4}$ inch. It is very closely allied to *Scoparia cyptastis*, from which it differs in having all the spaces between the transverse lines suffused with blackish, the lines themselves being grey instead of white; the first line is more strongly curved and the second line is sinuate, not indented beneath costa. The hind-wings are dark grey, tinged with yellow.

The perfect insect appears from December till March and frequents forest.

Described and figured from specimens kindly forwarded to me by Mr. Clarke.

SCOPARIA MANGANEUTIS.

(*Scoparia manganeutis*, Meyr., Trans. N.Z. Inst., xvii., 102.)

This species has occurred in the Oira Gorge.

The expansion of the wings is about $\frac{3}{4}$ inch. The antennae are grey, sharply serrate with the ciliae 1. The fore-wings are elongate with the termen slightly indented above the middle, light grey, irregularly mixed with white and irrorated with black; first line strong, distinct, white, rather curved; stigmata and second line dark margined, rather indistinct; sub-terminal line cloudy, dentate, interrupted above middle, apex of lower portion confluent with second line. Hind-wings whitish-grey.

The perfect insect appears in January.

I am unacquainted with this species. The above particulars have been extracted from the original description.

SCOPARIA CRYPSINOA.

(*Scoparia crypsinoa*, Meyr., Trans. N.Z. Inst., xvii., 102; *Scoparia agana*, ib., xlix., 119.)

(Plate XXII., fig. 9 ♂.)

This very obscure species has occurred at Mount Ruapehu, Mount Holdsworth, Mount Arthur, Castle Hill, Arthur's Pass, Takitimu Mountains and Lake Wakatipu at elevations of from 2,000 to 4,500 feet.

The fore-wings are very elongate, narrow, dull greyish- or brownish-ochreous, sometimes more or less speckled with black; the first line is obscure, very broad dull white and somewhat indented; the orbicular and claviform are elongate, small, distinct, dark brown; the reniform is obscure X-shaped, the lower portion

filled in with white; the second line is wavy, oblique, dull white, edged with dark brown towards the base; the veins are very irregularly marked with blackish; there is a series of blackish terminal dots. The hind-wings are dull ochreous.

The perfect insect appears from November till February, and frequents open country, usually at considerable elevations.

SCOPARIA ALOPECIAS.

(*Scoparia alopecias*, Meyr., Trans. Ent. Soc. Lond., 1901, 570.)

This species was discovered at Mount Cook by Fereday.

The expansion of the wings of the male is slightly under 1 inch; of the female about $\frac{3}{4}$ inch. The fore-wings are ferruginous brown; in the male sprinkled with white towards termen; cilia greyish-ochreous with two cloudy ferruginous-brown shades; hind-wings in male very pale whitish-fuscous, slightly brassy-tinged, termen suffused with fuscous; in female fuscous becoming darker posteriorly; cilia fuscous-whitish, in female fuscous at base.

Probably allied to *Scoparia axena*, but very distinct.

The perfect insect appears in February.

I am unacquainted with this species. The above has been taken from the original description.

SCOPARIA AXENA.

(*Scoparia axena*, Meyr., Trans. N.Z. Inst., xvii., 103.)

(Plate XLIV., fig. 22 ♂.)

This rather obscure-looking species has occurred at Arthur's Pass and on the Humboldt Range, Lake Wakatipu, at an altitude of about 4,000 feet above the sea-level. It has also been found at Dunedin and Invercargill.

The expansion of the wings is about $1\frac{1}{4}$ inches. The fore-wings are very dull brownish-ochreous with the veins irregularly marked in blackish; there is a series of blackish terminal dots; the stigmata are faintly indicated by patches of blackish scales and the margins of the wings are finely sprinkled with white scales. The hind-wings are very pale ochreous with white cilia.

This species is closely allied to *S. paltonmacha*, but separable by its larger size, broader fore-wings and absence of clear blackish lines on veins.

The perfect insect appears in January, and frequents open grassy country, usually at considerable elevations.

SCOPARIA PACHYERGA.

(*Scoparia pachyerga*, Meyr., Trans. N.Z. Inst., lviii., 697.)

(Plate LII., fig. 9 ♂.)

This species has occurred on Mount Holdsworth, Tara-rua Range, at an altitude of about 2,000 feet above the sea-level.

The expansion of the wings is slightly under 1 inch. The fore-wings are narrow-oblong, with the termen hardly oblique; brown with blackish markings, the transverse lines indicated by blackish margins; several irregular, black marks on basal area; first line strongly outwards-curved, with marked sinuation on fold; orbicular and claviform stigmata elongate-oval, almost confluent; reniform thick, X-shaped; second line wavy, conspicuous, with strong rounded projection above middle; subterminal line very obscure; veins marked in black on sub-terminal area; a

*Trans. N.Z. Inst., xlix., 221.

series of black sub-terminal dots; the cilia are pale brown with a dusky line. The hind-wings and cilia are pale brownish-ochreous.

The perfect insect appears in January, and may be looked for in sub-alpine forest.

SCOPARIA EXILIS.

(*Scoparia exilis*, Knaggs, Ent. Mo. Mag., iv., 81; Meyr., Trans. N.Z. Inst., xvii., 104.)

(Plate XXI., fig. 44 ♀.)

This rather obscure little species has been taken at Wellington, Christchurch, Mount Cook, Dunedin, Ida Valley, Lumsden and Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are very elongate, narrow, triangular with the termen very oblique, pale greyish-ochreous marked with white and darker grey; there are several very minute black marks at the base, a broad pale ochreous longitudinal band along the dorsum and a very narrow blackish edging on the costa; the first line is obscure, white, edged with grey towards the termen; the claviform is rather large elongate black and conspicuous; the reniform is represented by a pale, partially dark margined spot; the second line is tolerably distinct, wavy, oblique, white margined with dark grey towards the base except near the dorsum; the sub-terminal line is broad, white and uninterrupted; there is a series of confluent black marks on the termen, except at the apex; the veins are irregularly lined in black. The hind-wings are greyish-ochreous with a darker lunule, sub-terminal line and terminal shading.

The perfect insect appears from October till April, and frequents dry grassy hill slopes to elevations of about 2,000 feet. I have taken it fairly commonly on the cliffs facing the sea near Sinclair Head.

SCOPARIA STEROPAEA.

(*Scoparia steropaea*, Meyr., Trans. N.Z. Inst., xvii., 103.)

(Plate XXII., fig. 8 ♂.)

This very small species has occurred at Auckland, in the Wairarapa district, at Wellington, Castle Hill, Ida Valley, Dunedin, Lake Wakatipu, Invercargill, and Stewart Island. It is probably generally distributed throughout the country.

The expansion of the wings is barely $\frac{1}{2}$ inch. It is very closely allied to *S. exilis*, but in addition to its smaller size it differs from that species in the following respects: the dorsum is broadly bordered with white; there is a strong black streak from the base; a black triangular blotch beyond the middle; the second line is straighter and there is a small, black, triangular spot on the termen.

The perfect insect appears from November till March, and is sometimes fairly common in certain restricted localities. It is often attracted by light.

SCOPARIA ELAPHRA.

(*Scoparia elaphra*, Meyr., Trans. N.Z. Inst., xvii., 105.)

(Plate XXII., fig. 5 ♀.)

This very fragile-looking species has occurred at Palmerston North, Christchurch, Dunedin and Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The palpi are longer than usual. The fore-wings are elongate-triangular with

the apex acute and the termen obliquely-rounded; pale brownish-ochreous, whiter on the veins; the first line is indicated by a few blackish scales; the reniform is small black and distinct; the second line consists of an oblique series of black dots and there is a terminal series of black dots in addition. The hind-wings are very pale whitish-ochreous with faint grey terminal and sub-terminal lines and lunule.

The perfect insect appears from August till March and is attracted by light.

Described and figured from a specimen kindly given to me by Mr. Philpott.

SCOPARIA ATMOTGRAMMA.

(*Scoparia atmotgramma*, Meyr., Trans. N.Z. Inst., xvii., 202.)

(Plate XLV., fig. 25 ♂.)

This very distinctly-marked species has occurred at Lake Wakatipu and at Tisbury and West Plains, near Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are creamy grey with the spaces between the veins strongly and broadly marked in blackish-grey. The hind-wings, which have no long hairs in the cell, are pale grey, darker towards the apex and termen.

This species is apparently very closely allied to the somewhat variable *S. pallomacha*.

The perfect insect appears in September.

Described and figured from a specimen in Mr. Philpott's collection.

SCOPARIA PALTOMACHA.

(*Scoparia paltomacha*, Meyr., Trans. N.Z. Inst., xvii., 105.)

(Plate XXI., fig. 36 ♂, 37 ♀.)

This species has occurred on Mount Ruapehu, the Tararua Ranges, at Mount Hutt, Castle Hill, Arthur's Pass, and on the Humboldt Range, Lake Wakatipu, at elevations of from 2,500 to 4,000 feet.

The expansion of the wings is slightly over one inch. The fore-wings are rather elongate, dull brownish-grey, clouded with white towards the costa and termen and with the second and sub-terminal lines very faintly indicated by white shadings; there is sometimes a white discal dot and the veins are always distinctly lined with blackish-grey. The hind-wings are very pale whitish-ochreous.

The perfect insect appears in December and January, and frequents open country at considerable elevations.

SCOPARIA DELTOPHORA.

(*Scoparia deltophora*, Meyr., Trans. N.Z. Inst., xvii., 106.)

(Plate XXI., fig. 39 ♀.)

This species has occurred at Mount Arthur and Arthur's Pass at elevations of from 3,000 to 4,500 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-triangular with the apex acute and the termen slightly oblique; rather dull brownish-ochreous very obscurely streaked with whitish near the costa; there is a small elongate black discal spot and a series of extremely minute terminal dots. The hind-wings are pale ochreous.

Superficially, this species closely resembles some of the paler varieties of *Scoparia sabuloseella*, from which it differs in its slightly larger size and in the absence of any definite markings on the fore-wings, except the discal dot.

The perfect insect appears in January, and frequents open grassy country on the mountain sides.

SCOPARIA SABULOSELLA.

(*Crambus sabuloseellus*, Walk., Cat., xxvii., 178; *Scoparia sabuloseella*, Meyr., Trans. N.Z. Inst., xvii., 106.)

(Plate XXI., fig. 38 ♂.)

This obscure-looking species is extremely common and generally distributed throughout the country. It has also been found on the Chatham Islands, Stewart Island, and on Enderby Island in the Auckland Islands.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are pale ochreous, paler on the costa, occasionally clouded with darker brown longitudinally near the middle of the wing; there are a few dark brown specks near the base; the orbicular is minute blackish-brown; the reniform almost square, small, also blackish-brown; the two spots are sometimes connected by a cloudy streak; the veins are sometimes clouded with blackish-brown, especially in the female; there is a row of distinct black dots on the termen. The hind-wings are very pale ochreous.

This species is rather variable, some specimens being much darker than others. It may, however, always be known by the pale ochreous ground colour and two distinct blackish dots on the fore-wings.

The larva feeds in moss during the winter months.

The perfect insect appears from October till March, and is often very common in dry grassy localities. It is frequently abundant in fields and meadows in the midst of cultivation. This species is stated to occur in Chili.

SCOPARIA PANOPLA.

(*Scoparia panopla*, Meyr., Trans. N.Z. Inst., xvii., 107.)

(Plate XXI., fig. 43 ♂.)

This large and very distinctly-marked species has occurred at Mount Hutt and on the Hunter Mountains at an elevation of about 4,500 feet.

The expansion of the wings is $1\frac{1}{4}$ inches. The fore-wings are elongate-triangular with the termen slightly oblique, very pale brownish-ochreous with a broad white streak on the costa; there is a rather slender black central streak from the base to beyond $\frac{1}{2}$; another black streak above it from $\frac{1}{3}$ to $\frac{2}{3}$ slightly hooked at its termination; three cloudy blackish marks on the veins below the apex and two or three much less distinct marks near the tornus; all these black markings are margined with pale reddish-brown; there is a series of very distinct terminal dots. The hind-wings are very pale whitish-ochreous.

The perfect insect appears in January.

Described and figured from a specimen in the Fereday collection.

SCOPARIA CLAVATA.

(*Scoparia clavata*, Philp., Trans. N.Z. Inst., xlv., 116.)

(Plate XXI., fig. 40 ♀.)

This very distinct species was discovered by Mr. Philpott on the Hump Ridge, Southland, at an elevation of

3,000 feet above the sea-level. It has also occurred on the Hunter Mountains.

The expansion of the wings is 1 inch. The fore-wings are white with the veins very faintly marked in pale ochreous-brown; there is a thick black stripe from the base to slightly beyond $\frac{1}{2}$; another above this, on the middle third of the disc, terminating in an irregular reniform spot; a broad, curved sub-terminal band from the apex, almost reaching the dorsum, much narrower near the middle; all these markings are narrowly edged with pale brownish-ochreous; there is a series of black terminal dots. The hind-wings are pale greyish-ochreous with faint terminal and sub-terminal bands and lunule.

The perfect insect appears in December and frequents sub-alpine forest.

Described and figured from the type specimen kindly lent to me by Mr. Philpott. Another specimen taken by Mr. Philpott on the Hunter Mountains differs considerably from the type. The fore-wings are ochreous-brown and the terminal fascia is broadly interrupted at middle. The hind-wings are also ochreous-tinged.

SCOPARIA TRIVIRGATA.

(*Crambus trivirgatus*, Feld., Reis. Nov., pl. cxxxvii., 29; *Scoparia trivirgata*, Meyr., Trans. N.Z. Inst. xvii., 107.)

(Plate XXI., fig. 42 ♂.)

This very distinctly marked species has occurred on Mount Egmont, Mount Ruapehu (4,500 feet), Wellington, Mount Arthur (3,500 feet), Christchurch, Otira River, Mount Cook, Lake Wakatipu and Invercargill.

The expansion of the wings varies from $\frac{3}{4}$ inch to slightly over 1 inch. The fore-wings are narrow, elongate, pale ochreous, with the termen oblique; there is a longitudinal black streak in the middle from the base to about $\frac{1}{2}$; a second longitudinal streak slightly above the middle from $\frac{1}{2}$ to the apex, almost starting from the end of the first streak, and a third streak from about $\frac{1}{4}$ to the tornus, considerably below the other two. The hind-wings are very pale ochreous.

This species varies very much in size, also in the depth of the ground colour of both the fore- and hind-wings, and in the length of the longitudinal streak near the tornus. A rather distinct, large pale variety, is found at Lake Harris, a small mountain lake between the head of Lake Wakatipu and the West Coast. This variety has the fore- and hind-wings almost white, the black streaks being bordered with pale brownish-ochreous. A very dark variety with slaty-grey fore-wings and pale grey hind-wings also occurs on Mount Ruapehu.

The perfect insect appears from October till March, and is often locally abundant. Although found at lower levels, it is chiefly a mountain species, usually frequenting open grassy places between 3,000 and 4,000 feet. Southern and mountain specimens seem to be generally paler in colour and larger than specimens from lower levels or more northern localities.

Mr. Philpott remarks that the female of this species is often very small, measuring as little as three-fifths of an inch in wing-expanse, while the male reaches 1 inch. These small females have very poor powers of flight.

In a small open space in the Titiroa Forest (Hunter Mountains), at an elevation of about 2,700 feet, an isolated colony of this moth was found to have established itself. It is most unusual to find this species in the heart of the forest, and no individuals were noticed on the track either above or below. All the specimens obtained were slightly darker than the ordinary open-country form, the fore-wings having a greater admixture of brownish-ochreous and the black stripes being very pronounced. The locality is on the bank of a mountain stream, and it is suggested that isolation in this damp spot is producing a melanic variety.*

SCOPARIA AUGASTIS.

(*Scoparia augastis*, Meyr., Trans. N.Z. Inst., xxxix. 112.)

(Plate XXIV, fig. 8 ♀.)

This rather striking species has occurred at Dunedin and Invercargill.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are very narrow, becoming gradually dilated, with the termen rather oblique and the costa slightly arched before the apex; pale brownish-ochreous and very glossy with the middle portions of the wing and the spaces between the veins more or less speckled with dull white; the cilia are dull white with two pale brown lines. The hind-wings are very pale ochreous and very glossy with long hairs in the cell; the cilia are white with a very faint grey band near the edge of the wing.

The perfect insect appears from February till April, and frequents swampy localities. It was discovered by Mr. Philpott frequenting the flowers of the ragwort (*Senecio jacobaea*) after dark.

SCOPARIA PETRINA.

(*Xeroscopa petrina*, Meyr., Trans. N.Z. Inst., xvii., 111.)

(Plate XXI., figs. 11 and 22 varieties.)

This large and conspicuous species has occurred at Mount Arthur (4,000 feet), Christchurch, Castle Hill, Bealey River and Lake Guyon. It is generally distributed in the far south.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are white, more or less thickly sprinkled with grey or greyish-brown scales; there is often a dark brown bar on the costa at the base; the first line is rather wavy, strongly curved outwards from costa to dorsum, broad, white, broadly edged with greyish-brown; the orbicular is elliptical dark-margined, usually filled with yellowish-brown; the claviform is small, yellowish-brown, not pale centred; the reniform very large, very irregularly 8-shaped, filled in half with yellowish-brown and half with white; the second line is jagged, with a strong indentation below the costa, broad, white edged with dark grey; there is usually a very irregular brown band on the terminal area containing black dashes on the veins and a terminal series of black dots. The hind-wings are clear pale ochreous, sometimes slightly tinged with brown on the apex and termen.

This insect is very variable, some specimens having the fore-wings almost uniform grey with very faint markings and a cloudy darker shading along the costa. Its very large size, the peculiar form of the discal spots, and the

clear pale ochreous hind-wings are, however, good distinctive characters.

The perfect insect appears in January, flying freely amongst the tussock in open situations, usually on the mountain sides. It is not, however, by any means a common species. Mr. Philpott states that in the far south specimens may be met with throughout the year.

SCOPARIA HALOPIS.

(*Scoparia halapis*, Meyr., Sub-antarctic Islands of New Zealand, 72.)

(Plate XXIV., fig. 50 ♂.)

This rather obscure species was discovered at Auckland and Enderby Islands during the scientific expedition of November, 1907. It has also been taken by Mr. Philpott at Tuturau, near Invercargill.

The expansion of the wings is about 1 inch. The fore-wings are elongate and narrow, white, sparsely sprinkled with pale brown and a few blackish-brown scales; the markings are brown; the first line is very indistinct; the orbicular is elongate oval; the reniform kidney-shaped rather indefinite; the second line is represented by a succession of breaks in the dark brownish-black dashes which mark all the veins towards the termen; the ends of the veins are marked by a series of terminal dots. The hind-wings are pale ochreous, darker towards the apex and termen.

Mr. Meyrick points out that this species "is closely related to *Scoparia petrina*, but distinguishable by the rather shorter and broader fore-wings, whiter colouring, obsolescence of the orbicular and claviform, absence of bars in cilia and other small differences."

The perfect insect was taken at the end of November. It occurred on the edges of the forest at Norman's Inlet, Auckland Island, and on open country on Enderby Island. Mr. Philpott found it in February amongst scattered bush.

SCOPARIA CYAMEUTA.

(*Xeroscopa cyameuta*, Meyr., Trans. N.Z. Inst., xvii., 112.)

(Plate XXI., fig. 54 ♀.)

This large species has occurred at Mount Egmont, Ohakune, Wellington, Mount Arthur, Arthur's Pass, Bealey River, Mount Hutt, Dunedin, Lake Wakatipu, and is common and generally distributed in the Invercargill district.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are elongate, dull white, with dark blackish-brown markings; there is a short, rather cloudy, longitudinal streak at the base, two very cloudy marks, one before and one beyond middle, usually with a distinct somewhat oval mark between them; the first line is very obscure, often wanting; the second line is wavy, oblique, and very conspicuous; beyond the second line the veins are usually marked in brown; the cilia are dull white, tipped with brown and often barred with pale brown towards the base. The hind-wings are pale ochreous without markings.

This species varies much in the extent and depth of the blackish-brown markings. Some pale specimens approach *S. astragalota*.

*Trans. N.Z. Inst., xlix., 222.

The perfect insect appears from September till March, and usually frequents rather elevated situations. It is often abundant on mountains, at altitudes of between 3,000 and 4,000 feet. According to Mr. Philpott it is very common and generally distributed on the lowland plains in the neighbourhood of Invercargill.* It passes the winter in the imago state.

SCOPARIA FALSA.

(*Scoparia falsa*, Philp., Trans. N.Z. Inst., lv., 208.)

(Plate L., fig. 23 ♂.)

This species has been found by Mr. Philpott on the Dun Mountain and on Goulard Downs in the Nelson district.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are pale brownish-grey; the first line is faint, almost white; there is a conspicuous elongate white mark on the costa near the middle broadly margined first with dark brown and then with reddish; the second line is gently curved, white, with a series of blackish marks; there is a terminal series of black dots. The hind-wings are very pale whitish-ochreous.

The perfect insect appears from December till February.

Described and figured from a specimen kindly sent to me by Mr. Philpott.

SCOPARIA DECLIVIS.

(*Scoparia declivis*, Philp., Trans. N.Z. Inst., l., 126.)

(Plate XLIV., fig. 23 ♀.)

This very inconspicuous species was discovered by Mr. W. G. Howes at Commissioner's Creek, near Lake Wakatipu. It has also occurred at Macetown.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are whitish-grey finely sprinkled with darker grey; the lines are whitish, dark margined; the first line is very oblique, almost straight; the second line strongly bent inwards below the costa, thence outwards and then obliquely inwards; the stigmata are very indistinct; there is a series of blackish terminal dots. The hind-wings are pale ochreous.

The perfect insect appears in February.

Described and figured from a specimen in Mr. Philpott's collection.

SCOPARIA DRYPHACTIS.

(*Scoparia dryphactis*, Meyr., Trans. N.Z. Inst., xliii., 61.)

(Plate XXI., fig. 53 ♀.)

This large and conspicuous species is very common in the Routeburn Valley at the head of Lake Wakatipu.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are elongate-triangular with the termen slightly oblique; rather bright brownish-ochreous; there is a broad costal band of dark brown; three bright orange discal spots; the first line is indistinct; the second line edged with darker brown abruptly bent beneath the costa, thence gently inwards-curved to the termen; a series of short brown dashes is situated on the veins, inter-

rupted by the second and sub-terminal lines. The hind-wings are bright ochreous.

The perfect insect appears in February, and frequents forest.

SCOPARIA ASTRAGALOTA.

(*Xeroscopa astragalota*, Meyr., Trans. N.Z. Inst., xvii., 113.)

(Plate XXIV., fig. 49 ♂.)

This species has occurred at Wellington, Mount Arthur, Mount Hutt, Otira, and the Routeburn Valley at the head of Lake Wakatipu.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are very pale, ochreous with three broad, oblique brown marks on the costa; the first near the base, the second at about $\frac{1}{3}$, sometimes continued towards the dorsum as a very faint first line, the third at about $\frac{2}{3}$ covering the reniform stigma; the second line is wavy and very faint, except on the costa; the termen is very faintly shaded with brown and there is usually a small triangular brown patch near its middle; a terminal series of obscure brown dots. The hind-wings are pale ochreous, very faintly tinged with brown towards the apex. The cilia of all the wings are pale ochreous mixed with pale brown.

The species varies slightly in the extent and intensity of the brown markings and in the depth of the ground colour. Some forms approach *S. cyameuta* in general appearance, but may be separated by the shorter basal streak.

The perfect insect appears in December and January. It is rather a rare species and when taken is usually captured at light. It has been found from the sea-level to elevations of about 4,000 feet.

SCOPARIA ROTUELLA.

(*Crambus rotucllus*, Feld., Reis. Nov., pl. cxxxvii., 30; *Xeroscopa rotuella*, Meyr., Trans. N.Z. Inst., xvii., 113.)

(Plate XXI., fig. 41 ♂.)

This very distinct species has occurred occasionally at Ohakune, Wellington, Mount Arthur, Buller River, Mount Hutt, and West Plains near Invercargill. It is probably generally distributed throughout the country, and has been taken on Campbell Island.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are clear brownish-grey with two very conspicuous, narrow, longitudinal, black lines; one in the middle from the base to about $\frac{1}{3}$, the other from slightly less than $\frac{1}{3}$ to about $\frac{2}{3}$, the last-named line being considerably thickened towards the termen and its extremity concave both towards costa and termen; the sub-terminal line is represented by a strongly curved series of numerous fine black dots and there is a similar series of dots on the termen itself. The hind-wings are pale greyish-ochreous slightly darker towards the apex.

The perfect insect appears from October till April, and is generally taken at light. It frequents localities ranging from the sea-level to elevations of about 4,000 feet.

SCOPARIA SCRIPTA.

(*Scoparia scripta*, Philp., Trans. N.Z. Inst., l., 126.)

(Plate XLIV., fig. 24 ♂.)

This fine, boldly-marked species was discovered by Mr. Philpott on the Hunter Mountains at an elevation of about 3,000 feet above the sea-level.

**Scoparia petrina*, *S. halopsis*, *S. cyameuta* and *S. astragalota* very closely resemble each other and are difficult to separate, although probably all are good species.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are very pale brownish-ochreous faintly speckled with very pale grey; there is a broad upturned black longitudinal streak from the base to about $\frac{2}{3}$; a conspicuous black longitudinal bar below the middle of the costa with two clean cut indentations representing the orbicular and reniform stigmata; the second line is marked by a doubly curved series of black dots and there is also a series of large black terminal dots. The hind-wings are pale ochreous faintly shaded with brown towards the apex and termen, with a faint lunule and sub-terminal line.

This species may be separated from *S. rotuella* by its larger size, heavier and more distinct markings and disconnected orbicular and reniform. The acutely-pointed basal streak will distinguish it from *S. clavata*.

The perfect insect appears in January and frequents damp gullies.

Described and figured from Mr. Philpott's specimens.

SCOPARIA HARPALEA.

(*Xeroscopa harpalea*, Meyr., Trans. N.Z. Inst., xvi., 114.)

A single specimen of this species was taken by Mr. Meyrick in the Otira Gorge.

The expansion of the wings of the male is slightly under 1 inch. The fore-wings are very elongate, triangular, narrow at base, costa slightly arched, apex almost acutely pointed, termen strongly sinuate, oblique: white irrorated with ochreous-grey; veins obscurely marked with blackish; first line obsolete; orbicular roundish, claviform elongate-oval, reniform irregular, all very obscure, slightly ochreous-tinged, partially dark-margined; second line whitish, obscure, interrupting streaks on veins; sub-terminal obscurely whitish, confluent with second line in middle; a terminal row of blackish dots; cilia whitish, with a fuscous-grey line. Hind-wings: very pale greyish-ochreous; postmedian line and apex grey; cilia white, base ochreous, with a grey line round apex.

A rather obscurely-marked species, but distinguished from all by the more pointed apex and strongly sinuate termen of fore-wings.

The perfect insect appears in January and may be looked for on rock facings.

This species seems to have escaped detection by subsequent collectors. The above has been taken from the original description.

SCOPARIA EJUNCIDA.

(*Scoparia ejuncida*, Knaggs, Ent. Mo. Mag., iv., 81; *Xeroscopa ejuncida*, Meyr., Trans. N.Z. Inst., xvii., 114.)
(Plate XXI., fig. 52 ♀.)

This species has occurred at Bealey River, Castle Hill, Lake Coleridge, Mount Hutt, Dunedin, and Lake Wakatipu.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are rather dark grey clouded with white on the costa, sub-terminal line and termen; there are two very fine, black, longitudinal lines; the first from the base, near the centre of the wing, to about $\frac{2}{3}$; the second, nearer the costa, from about $\frac{1}{2}$ to about $\frac{2}{3}$; beyond this the veins are more or less distinctly marked in blackish and there is a terminal series of black dots; the cilia are grey barred with white. The hind-wings are pale whitish-ochreous and the cilia are white with a grey line.

The perfect insect appears from December to March. According to Mr. Meyrick it is generally found on the out-

skirts of beech forests, at elevations of from 2,000 to 3,000 feet, and in such localities it is stated to be common. I have taken two specimens only and these were found on the Humboldt Range, Lake Wakatipu, at an altitude of about 4,000 feet.

SCOPARIA NIPHOSPORA.

(*Xeroscopa niphospora*, Meyr., Trans. N.Z. Inst., xvii., 115.)
(Plate XXIV., fig. 9 ♂.)

This pretty species has been taken at Mount Holdsworth (Tararua Range), Mount Arthur, Castle Hill, Arthur's Pass, Mount Ida, Hunter Mountains and Lake Wakatipu at elevations ranging from 2,500 to 4,500 feet. It probably occurs generally, on mountains, throughout New Zealand.

The expansion of the wings is slightly over $1\frac{1}{2}$ inches. The fore-wings are white with a narrow, longitudinal, shaded streak of chocolate-brown on the costa and a few minute dots of the same colour on the veins; the orbicular and reniform are represented by small black spots and there is a terminal series of small black dots; the cilia are white with two pale brown lines. The hind-wings are white, slightly tinged with ochreous; the cilia are clear shining white.

This species varies considerably in the extent and intensity of the brown markings, but may always be known by its white colouring and chocolate-brown costal streak.

The perfect insect appears from December till February, and frequents dry grassy situations on the mountain sides. On a hot day it has a delightfully cool appearance when flying.

SCOPARIA APHELES.

(*Scoparia apheles*, Meyr., Trans. N.Z. Inst., xvii., 115.)

A single specimen of this species was discovered by Mr. Meyrick at Arthur's Pass at an elevation of 4,500 feet above the sea-level.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are very elongate-triangular, rather light brownish-ochreous; lines wholly obsolete; reniform indicated by a faint darker mark; veins posteriorly somewhat whitish. Hind-wings ochreous-whitish.

The perfect insect appears in January and may be looked for on grassy slopes high on the mountains.

I am unacquainted with this species. The above particulars have been extracted from the original description.

SCOPARIA ASPIDOTA.

(*Xeroscopa aspidota*, Meyr., Trans. N.Z. Inst., xvii., 115.)
(Plate XXIV., fig. 10 ♀.)

This very conspicuous species has occurred at Rauimu, Waimarino, Wellington, Castle Hill, Mount Hutt, Buller River, Dunedin, Lake Wakatipu, Invercargill and Stewart Island. It is probably generally distributed throughout New Zealand.

The expansion of the wings is slightly over 1 inch. The fore-wings have a small, very dark, blackish-brown, triangular mark on the costa at the base, situated in a large pale yellowish-brown basal patch, this is followed by a very broad, blackish-brown, central band, much wider on the costa than on the dorsum; next a large, somewhat oval, pure white, patch, followed by a broad terminal band of pale yellowish-brown, shaded with blackish-brown towards the costa and dorsum; there is a series

of small blackish marks reaching half-way across the wing at about $\frac{1}{2}$ and another series on the lower half of the termen. The hind-wings are dull brownish-ochreous with an indistinct sub-terminal line. The cilia of all the wings are dull brownish-ochreous.

There is slight variation in the intensity of the markings.

The perfect insect appears in December and January, and chiefly frequents forest. It is usually captured at light. The wing markings, although conspicuous, are clearly imitative of bird droppings, and must afford the insect efficient protection when resting on the leaves or branches of trees.

SCOPARIA SIDERASPIS.

(*Scoparia sideraspis*, Meyr., Trans. Ent. Soc. Lond., 1905, 231.)
(Plate XXIV., fig. 24 ♀.)

A few specimens of this conspicuous species have occurred on Vanguard Peak, Advance Peak, Mount Earnslaw and the Humboldt Range, Lake Wakatipu, at elevations of about 5,000 feet.

The expansion of the wings is about $1\frac{1}{2}$ inches. *The body and legs are very stout. The fore-wings are somewhat dilated towards the termen, very dark slaty-grey with brassy-green reflections; there are no markings except the reniform, which is ill-defined and slightly darker than the rest of the wing. The hind-wings are very dark brownish-ochreous with a broad dark brownish-black terminal band. The cilia of all the wings are dark brown. The undersurface, especially of the hind-wings, is much clouded with ochreous-yellow.*

The perfect insect appears from January till March, and frequents rocky places on high mountains, generally above 5,000 feet. It is only to be found during the hottest sunshine and flies with extreme rapidity. When resting on the rocks, with closed wings, it is very hard to see owing to the highly protective colouring of the fore-wings.

The superficial resemblance of this insect to some forms of *Tauroscopa glaucophanes* and to the mountain species included in the genus *Gelophaula* is interesting and remarkable.

SCOPARIA NOMEUTIS.

(*Scoparia nomeutis*, Meyr., Trans. N.Z. Inst., xvii., 116.)
(Plate L., fig. 28 ♂.)

This very dingy, obscurely-marked insect has occurred on the mountains around Lake Wakatipu, on Longwood Range, The Hump, and the Hunter Mountains at elevations of from 3,500 to 5,000 feet above sea-level.

The expansion of the wings is about $\frac{3}{4}$ inch. *The fore-wings are rather elongate-triangular; dull grey heavily speckled with dull white, the markings are blackish; there are several small black marks near the base; the first line is obscure oblique hardly curved, slightly indented; the orbicular and claviform are very small black; the reniform 8-shaped, black-margined except above and beneath, touching a blackish cloud on middle of costa; the second line is rather abruptly angulated above middle and indented beneath costa; the sub-terminal line very obscure, touching second line in middle. The hind-wings are grey. All the cilia are grey, mixed with dull white.*

Mr. Meyrick points out that the long antennal cilia of the male is a good distinctive character so far as that sex is concerned.

The perfect insect appears from December till March, and frequents rocky places on mountains, where its dull grey colouring is highly protective. Mr. Philpott points out that the Hunter Mountain form is unusually large, a characteristic of several species inhabiting that locality. It is probably to be accounted for by the abundant vegetation, and the sheltered position of the range.*

SCOPARIA PURA.

(*Scoparia pura*, Philp., Trans. N.Z. Inst., lv., 208.)
(Plate XXIV., fig. 39 ♂, 40 ♀.)

This species, which has long been confounded with *S. nomeutis*, has occurred on Mount Arthur and on the mountains around Lake Wakatipu at elevations from 3,500 to 5,000 feet.

The expansion of the wings of the male is $\frac{3}{4}$ inch, of the female $\frac{1}{2}$ inch. *The fore-wings of the male are pale grey with blackish markings; the first line is strongly outwards curved, oblique; the orbicular and claviform are distinct; the orbicular ovate, the claviform elongate; the reniform is 8-shaped; the second line distinct wavy oblique, strongly angulated below the costa; all these markings are more or less edged with white; there is a series of terminal dots. The hind-wings are dark ochreous-grey, paler near the base. In the female the fore-wings are very pale grey, slightly clouded with darker grey on the disc and dorsum and the dark markings are much more conspicuous than in the male.*

The perfect insect appears in January.

SCOPARIA CALIGINOSA.

(*Scoparia caliginosa*, Philp., Trans. N.Z. Inst., l., 127.)
(Plate XLV., fig. 2 ♀.)

This obscure species was discovered by Mr. J. H. Lewis, probably at Matakauui.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. *The fore-wings are pale grey, with blackish-grey markings; there is an oblique mark on the costa near the base; the first line is distinct, strongly angulated outwards near the middle; the reniform is cloudy with an indistinct paler centre; there is a very slender wavy second line followed by a very large blotch covering the whole of the sub-terminal area and a fine terminal line. The hind-wings are dark grey. The cilia of all the wings are grey.*

Described and figured from the type specimen in Mr. Philpott's collection.

SCOPARIA PARACHALCA.

(*Scoparia parachalca*, Meyr., Trans. Ent. Soc. Lond. 1901, 569.)
(Plate XXII., fig. 10 ♀.)

This species was discovered flying over the stony banks of Lake Tekapo.

The expansion of the wings is $\frac{1}{2}$ inch. *The fore-wings are golden bronzy-brown almost destitute of distinct markings. The hind-wings are dark brown, darker towards the termen.*

The perfect insect appears in December, and flies rapidly in the hottest sunshine.

SCOPARIA ORGANAEEA.

(*Scoparia organaea*, Meyr., Trans. Ent. Soc. Lond., 1901, 569.)
(Plate XXII., fig. 27 ♂.)

This species is very common on the old moraines near the Mount Cook Hermitage. It has also occurred on Flag-

*Trans. N.Z. Inst., xlix., 223.

staff Hill, at Broad Bay (Otago Peninsula) and at the Bluff.

The expansion of the wings is not quite $\frac{1}{2}$ inch. The fore-wings are very dark brownish-grey, very slightly tinged with bronzy-purple, with black markings; there are two short, rather oblique lines at the base; the first line is very oblique edged with grey towards the base and with two short thick projections towards the termen; the reniform is X-shaped, dull grey above, black in the middle and dull white below; the second line is black, oblique and almost straight; the terminal area is dark brown, very slightly speckled with grey in place of the sub-terminal line. The hind-wings are dark brown, darker towards the termen.

The perfect insect appears from November till January.

SCOPARIA PASCOELLA.

(*Scoparia pascoella*, Philp., Trans. N.Z. Inst., lii., 43.)

(Plate XLVIII., 8 ♀.)

This species was discovered by Mr. Philpott on Tooth Peaks, Lake Wakatipu, at an elevation of 3,000 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather broad, somewhat rectangular, with the termen slightly oblique; dull reddish-ochreous speckled with blackish and with white markings; there are numerous scattered white scales on the basal third and two minute black marks at the base itself; the first line is broad white, slightly outwards-curved; immediately beyond the first line there are three or four short longitudinal black bars, those nearest the dorsum broader than the others; the second line is white, inwards-curved below middle where it is much suffused towards base; there are two cloudy white patches and several indistinct black bars on the sub-terminal area. The hind-wings are dull ochreous, very densely speckled with blackish, especially towards the termen. The cilia of all the wings are dull ochreous with a blackish basal line.

Varies considerably in the distinctness of markings and extent of white suffusion.

The perfect insect appears towards the end of December.

SCOPARIA EPICREMNA.

(*Scoparia epicremna*, Meyr., Trans. N.Z. Inst., xvii., 117.)

(Plate XLV., fig. 4 ♀.)

This obscure-looking species has occurred on Mount Arthur near Nelson, and at Castle Hill, West Coast Road, at elevations of about 2,500 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are yellowish-brown; the edges of the basal patch and median band are pale grey and there are also some irregular pale grey blotches in the disc and an obscure pale grey sub-terminal line. The hind-wings are grey, darker towards the termen.

The perfect insect appears in January.

Described and figured from a single specimen in poor condition.

SCOPARIA LUMINATRIX.

(*Scoparia luminatrix*, Meyr., Trans. N.Z. Inst. xli., 8.)

(Plate XXI., fig. 48 ♂.)

This species occurs very commonly in the Otago Valley and is also recorded from the Routeburn Valley, Lake Wakatipu, Invercargill, and other localities in the far south.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are rather elongate with the costa slightly bent before

the apex, dark ochreous-brown with the veins broadly marked with black scales, except where crossed by the transverse lines; the first line is white, slightly dentate and outwards-curved near the middle; the orbicular and claviform are black, ill-defined, often confluent and connected with a black mark on the costa; the reniform is indistinct, black, 8-shaped with white centres, the lower centre being often rather conspicuous; the second line is very distinct, white, slightly indented near reniform and extending from about $\frac{1}{2}$ on costa to $\frac{3}{4}$ on dorsum; the sub-terminal line is rather cloudy, white, usually interrupted above the middle; the cilia are pale brown with two black lines interrupted with pale bars. The hind-wings are pale brassy-ochreous-brown, clouded with dull brown near the apex and termen; and with a dull brown lunule; the cilia are pale yellowish-brown with a darker line.

This species is rather variable in the extent of the black and white scales which form the principal markings.

The perfect insect appears from October till January. It frequents forest and, in certain localities, is very common. Its colouring is highly protective when resting on tree trunks with closed wings.

SCOPARIA LEGNOTA.

(*Xeroscopa legnota*, Meyr., Trans. N.Z. Inst., xvii., 117.)

(Plate XXI., fig. 49 ♂.)

This rather faintly-marked species has occurred at Mount Hutt, Otira River, Lake Wakatipu and Invercargill, but appears to be very local.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are very pale whitish-ochreous; there is a cloudy pale brown basal area; the first line is rather indistinct, wavy, edged with dark brown towards the termen; there is an irregular cloudy blackish-brown mark on the costa enclosing a small, elliptical, white orbicular spot and reaching as far as the reniform spot which is also white, X-shaped, irregularly edged with black; the second line is nearly straight, oblique, edged with brown for half its length towards the base and costa; there is a broad brown band between the second and sub-terminal lines; the sub-terminal line is slightly waved; there are a few indistinct brown terminal dots. The hind-wings are pale greyish-ochreous, darker towards the apex.

This species varies slightly in the intensity of the markings. In general appearance it somewhat suggests a pale specimen of *Scoparia luminatrix*, but seems to be quite distinct from that species. It also somewhat resembles *Scoparia chalara*, but is much smaller, whiter and more distinctly marked.

The perfect insect appears in December and January, frequenting forest. It is very rarely met with.

SCOPARIA OCTOPHORA.

(*Scoparia octophora*, Meyr., Trans. N.Z. Inst., xvii., 118.)

(Plate XXIV., fig. 21 ♀.)

This rather inconspicuous species has been taken at Wellington. It is probably generally distributed throughout the South Island, having occurred at Christchurch, Akaroa, Castle Hill, Bealey, Otira, Mount Hutt, Lake Wakatipu and Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are brownish-ochreous, rather glossy, more or less speckled with dark-brown, generally forming dark lines on the veins, and with a few white scales; the first line is very indistinct; the orbicular

and claviform are obscurely indicated by patches of blackish scales; the reniform is 8-shaped, edged with dark brown, ochreous above and white below; the second line is distinct, dull white, dark margined, moderately curved in the middle; there is a terminal series of black dots. The hind-wings are ochreous, shaded with pale brown on the termen.

The perfect insect appears from December till March, and frequents dry grassy places from the sea-level to about 3,000 feet. It is very fond of resting amongst "Wild Irishmen" (*Discaria toumatou*), which frequently grow in profusion in such localities, and numerous specimens may often be dislodged from these shrubs.

SCOPARIA CHALARA.

(*Scoparia chalara*, Meyr., Trans. Ent. Soc. Lond., 1901, 570.)

(Plate XXIV., fig. 41. ♀.)

This species is very common in the neighbourhood of the Hermitage at Mount Cook at elevations of from 2,500 to 3,000 feet above the sea-level. It has also occurred on the Lyttelton Hills, at Ida Valley, Central Otago, and at Lake Wakatipu.

The expansion of the wings is about 1 inch. It very closely resembles *Scoparia octophora* but is larger; the general colouring is paler, the second line of the fore-wings straighter and there is a faint reddish-brown shading beyond the second line.

The perfect insect appears from November till February, and is very common on the old moraines near the Mount Cook Hermitage. Like *S. octophora* it has a great liking for resting in the branches of the "Wild Irishmen" (*Discaria toumatou*), which are very numerous in that locality.

SCOPARIA FUMATA.

(*Scoparia fumata*, Philp., Trans. N.Z. Inst., xvii., 198.)

(Plate XLIV., fig. 11 ♂.)

This rather dull-looking species was discovered by Mr. Philpott on Longwood Range, Southland, at an altitude of about 3,000 feet. It has also occurred on Flagstaff Hill, near Dunedin.

The expansion of the wings is slightly under 1 inch. The fore-wings are dull brownish-ochreous with the lines and stigmata marked in dark brown; the first line is very indistinct; the orbicular is elongate, sometimes dot-like; the claviform also elongate; the reniform sub-quadrate, usually with a projection inwards very conspicuous; the second line is strongly curved inwards below the middle; there is a terminal series of minute dots. The hind-wings are pale greyish-ochreous with darker sub-terminal line and lunule. All the cilia are dull greyish-ochreous.

Distinguished from *Scoparia chalara* by its darker colour and distinct dash-like claviform, and from *S. octophora* by the second line, which is unindented.

The perfect insect appears in December and is found on the open mountain side.

Described and figured from Mr. Philpott's specimens.

SCOPARIA ASTERISCA.

(*Xeroscopa asterisca*, Meyr., Trans. N.Z. Inst., xvii., 118.)

(Plate XXI., fig. 47 ♀.)

This pretty species has occurred at Raurimu and Ohakune, at several localities in the neighbourhood of Welling-

ton, Christchurch, Arthur's Pass, Mount Hutt, Lake Wakatipu and Invercargill, but is nowhere common.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are warm brown, darker at the base; there is a short black mark on the dorsum at the base; the first line is very obscure; the reniform is black, x-shaped and conspicuous; the second line is very fine, white, jagged and strongly curved; the terminal area is dark brownish-black containing a short fine white mark near the apex and another similar mark near the tornus; the cilia are very dark brown. The hind-wings are greyish-ochreous with a narrow, dark grey terminal shading and lunule; the cilia are dark greyish-ochreous.

Slight variations occur in respect of the depth of the ground colour of the fore-wings and terminal shading of hind-wings.

The perfect insect appears from December to March, and is usually taken at sugar or light. It has been found at elevations ranging from the sea-level to 4,500 feet.

SCOPARIA LEUCOGRAMMA.

(*Xeroscopa leucogramma*, Meyr., Trans. N.Z. Inst., xvii., 119.)

(Plate XXII., fig. 41 ♀.)

This very distinct and neatly-marked species has occurred at Mount Egmont, Waimarino, Mount Holdsworth (Tararua Range), Wellington, Dun Mountain (Nelson), Mount Hutt, Lake Wakatipu, Invercargill and Sunnyside (Waiau), but it is not common at any of these localities.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are very dark brownish-black with creamy white markings; there are a few minute dots at the base; the first line is very distinct, slender, moderately curved with several small indentations; the reniform is round, small and rather obscure; the second line is very slender, well defined, strongly curved in the middle towards the termen and slightly indented throughout; there is sometimes a very fine, interrupted, sub-terminal line. The hind-wings are light grey in the male, dark brownish-grey in the female with darker lunule and terminal shading. The cilia of all the wings is dark brownish-grey.

There is slight variation in the thickness and indentations of the first and second lines, and in the presence or absence of the sub-terminal line.

The larva feeds on mosses.

The perfect insect appears from October till January, and frequents forests from the sea-level to about 3,000 ft.

Genus 12.—CLEPSICOSMA, Meyr.

Face slightly prominent, oblique. Antennae $\frac{3}{4}$, in ♂ fasciculate-ciliated. Labial palpi long, porrected, with loosely projecting scales, attenuated to apex, terminal joint concealed. Maxillary palpi rather long, triangularly dilated with loose scales. Tibial outer spurs $\frac{3}{4}$ of inner. (Plate D., fig. 47. Head of *Clepsicosma iridia*.)

A curious endemic genus.

We have one species in New Zealand.

CLEPSICOSMA IRIDIA.

(*Clepsicosma iridia*, Meyr., Trans. N.Z. Inst., xx., 64.)

(Plate XXIV., fig. 22 ♂.)

This interesting little species has occurred on the Waitakere Ranges near Auckland, Waimarino, at the foot of Mount Holdsworth and at Kaitoke near Wellington. It is, however, a rare and local insect.

The expansion of the wings is barely $\frac{3}{4}$ inch. The fore-wings are very pale brownish-ochreous, almost white, with a dull brown shading on the costa near the base and a very conspicuous blackish discal spot; there is an indistinct, jagged, whitish, sub-terminal line, edged with pale brown towards base, sometimes emitting a faint loop which almost touches the discal spot; there is a series of blackish-brown terminal marks. The hind-wings are white, with a rather large dusky lunule and a wavy white sub-terminal line extending to within $\frac{1}{4}$ of the tornus; near its termination this line is brilliant white and iridescent beside being here strongly edged with black; there is a series of blackish-brown sub-terminal marks.

The perfect insect appears from December till February. It frequents swampy forests. Sometimes it is fairly common amongst sedge (*Gahnia setifolia*), but is very loth to fly, usually secreting itself amongst the leaves of the sedge near the ground, and thus eluding pursuit.

Sub-family 5.—PYRALIDES.

Maxillary palpi present. Fore-wings with 7, and 8 out of 9. Hind-wings without defined pecten of hairs on lower margin of cell, 4 and 5 closely approximated or stalked, 7 out of 6 near origin, free or anastomosing with 8.

A family of moderate extent and general distribution, but the only three New Zealand species are not indigenous.

Three genera are represented in New Zealand.

1. DIPLOPSEUSTIS.
2. ENDOTRICHA.
3. PYRALIS.

Genus 1.—DIPLOPSEUSTIS, Meyr.

Labial palpi rather long, porrected, second joint with dense rather short projecting scales, forming a short apical tuft beneath, terminal joint moderate, slender, obliquely ascending. Maxillary palpi moderate, triangularly dilated with scales. Fore-wings with 4 and 5 stalked. Hind-wings with 4 and 5 stalked, 7 anastomosing with 8. (Plate D, figs. 50, 51 neuration of *Diploseustis perieralis*; fig. 52 head of ditto.)

Perhaps contains only the following species.

DIPLOPSEUSTIS PERIERALIS.

(*Diploseustis perieralis*, Walk., Cat., xix., 958 (*pericresalis*); *Cymoriza minima*, Butl., Proc. Zool. Soc., 1880, 684; *Diploseustis minima*, Meyr., Trans. Ent. Soc. Lond., 1884, 285; Trans. N.Z. Inst., xx., 63.)

(Plate XXII., fig. 44 ♂.)

This rather inconspicuous species has occurred at Auckland, Wanganui, Wellington, Christchurch, Dunedin, Wyndham and Invercargill, but is not common.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather narrow, with the termen rather deeply indented below the apex, pale yellowish-brown or dull greyish-brown; there is a slightly curved, white-edged, blackish, transverse line at about $\frac{1}{4}$; a black discal dot; a brownish shading on the costa with several minute white dots bordered with blackish-brown; a very conspicuous blackish transverse line at $\frac{2}{3}$, edged with white towards the termen, and strongly curved outwards near the middle; the terminal area is shaded with yellowish brown, and the termen itself with blackish-brown or darker grey; the cilia are pale ochreous, barred with dark brown. The hind-wings are grey, speckled with black; the termen is slightly indented, with a wavy pale terminal line which cuts the apex of a blackish triangular spot.

The perfect insect appears in February and March, and is sometimes attracted by light. According to Mr.

Meyrick it is common in Sydney and Melbourne, but Australian specimens, although identical, are darker than New Zealand specimens. It also occurs in Fiji, Formosa, Borneo, and Assam. It is usually found near towns, and is probably attached to some cultivated plant.

Genus 2.—ENDOTRICHA, Zell.

Antennae in male fasciculate-ciliated. Labial palpi ascending, second joint with projecting scales beneath, terminal short, exposed. Maxillary palpi very short. Thorax in male with patagia much elongated, terminating in long tuft. Fore-wings with veins 4 and 5 connate or stalked. Hind-wings with 4 and 5 connate or stalked, 7 anastomosing strongly with 8.

An Indo-Malayan genus of moderate size, of which only one species has reached New Zealand.

ENDOTRICHA PYROSALIS.

(*Endotricha pyrosalis*, Guen., Lep., viii., 219.)

(Plate XLVIII., fig. 14 ♂.)

A single specimen of this very distinct Australian species was taken by Mr. Hamilton at Mount Denny in February, 1911.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings, which have the costa strongly arched before the apex, are deep ochreous, there is an almost straight dark pink transverse line beyond the middle; inside this line there are a few scattered pink scales; outside it the whole wing is heavily sprinkled with pink except on a fine sub-terminal line; the cilia are whitish with a brown basal line and pinkish tornal tuft. The hind-wings are bright ochreous, clouded with pink towards the termen; the cilia are pinkish with a brown basal line.

Described and figured from an Australian specimen kindly lent to me by Mr. Philpott.

Genus 3.—PYRALIS, Linn.

Labial palpi ascending, second joint rough-scaled, terminal joint moderate. Maxillary palpi filiform. Fore-wings with 4 and 5 stalked. Hind-wings with 4 and 5 stalked, 8 free.

A genus of about 20 species, chiefly Indo-Malayan, but some of the species have been very widely spread.

The single New Zealand species is a very common domestic insect, introduced through civilization.

PYRALIS FARINALIS.

(*Pyralis farinalis*, Linn., Syst. Nat. (10), 226; Meyr., Trans. N.Z. Inst., xvii., 122.)

(Plate XXIV., fig. 23 ♀.)

This well-known species is probably common in most granaries and bakehouses throughout the country.

The expansion of the wings is about 1 inch. The fore-wings are dull reddish-brown on the basal and terminal areas with the space between the first and second lines ochreous; the first line is pale ochreous strongly bent outwards near the middle; the second line is also pale ochreous with a very prominent rounded projection in the middle, almost reaching the termen; except at the apex, the terminal area is tinged with grey. The hind-wings are greyish-ochreous with two very wavy transverse lines.

The larva feeds on flour and corn refuse.

The perfect insect appears in March and April. It is generally distributed in Australia and occurs also throughout most of the world, but is probably Central Asiatic in origin.

CHAPTER XII.

THE THYRIDIDAE.

THE *Thyrididae* are characterized as follows:—

The maxillary palpi are obsolete. The fore-wings have veins 8 and 9 usually separate. The hind-wings are without a defined pecten of hairs on the lower margin of the cell; vein 1 is absent and vein 8 usually free. (See Plate E, figs. 1, 2 and 3).

This small family is of special interest as it appears probable that it includes the nearest living representatives of the ancestors of the Butterflies. Owing to the unusual combination of characters displayed by its members systematists have variously placed it with the Geometers, the Tortrices, and the Pyrales. Only one genus, containing a single species, occurs in New Zealand, but the family is fairly well represented in the tropics.

Genus 1.—MOROVA, Walk.

Face prominent. Labial palpi short, stout, subascending, with appressed scales, terminal joint very short, obtuse. Fore-wings with 8 and 9 short-stalked or approximated towards base. Hindwings with 5 tolerably remote from angle, 7 from before upper angle, 8 free. (Plate E figs. 1, 2 neuration of *Morova subfasciata*; fig. 3 head of ditto).

Includes only the following species.

MOROVA SUBFASCIATA.

(*Morova subfasciata*, Walk., Cat., 32, 523; Meyr., Trans. N.Z. Inst., XVI., 108; *Cacoccia gallicolens*, Butl., Voy. Ereb. Terr., Ins., 46).

(Plate XXIV., fig. 25 ♂; fig. 26 ♀.)

This interesting insect has occurred at Wellington, Christchurch, Akaroa, Dunedin, and Invercargill. It is probably generally distributed throughout the country, although very rare in the extreme south.

The expansion of the wings of the male is $\frac{7}{8}$ inch, of the female $1\frac{3}{8}$ inches. The costa is strongly arched before the apex and the termen of both wings strongly bowed outwards near the middle. The male has all the wings and body dark reddish-brown with an obscure darker brown central band across the middle of both wings; there are numerous scattered fine, dark brown wavy marks, and a short curved band from the costa before the apex, which does not reach the dorsum. The female

has the ground colour very bright ochreous-brown, with the markings similar to the male, but much more conspicuous owing to the paler ground colour.

Both sexes vary considerably in size, in the depth of the ground colour, and in the intensity of the markings, but the male is always much smaller and darker than the female.

The larva inhabits swellings in the stems of *Mühlenbeckia* and *Parsonsia* during the spring and early summer. These swellings are, no doubt, abnormal growths which take place in the plant owing to the presence of the larva, and are thus similar in their nature to galls.

The full-grown larva is rather stout with the segments deeply excised. The head is small, dark brown and shining; the second segment has a large, dark brown, horny dorsal plate; the rest of the larva is pinkish-ochreous; the twelfth and thirteenth segments are partially horny on the back; there is an obscure dorsal line; segments three to eleven inclusive are furnished with several very indistinct warts; the legs are small and horny and the prolegs minute.

The pupa lies in a chamber in the centre of one of the swellings, the larva having previously prepared a safe outlet for the moth in the form of a small tunnel leading to the air, its extreme end remaining closed by a thin pellicle of the original bark, which effectually prevents the inmate's resting-place being discovered from the exterior. This cavity is also protected by a curtain of silk placed just above the tunnel.

The pupa, which is somewhat elongate, dark brown and shining, has a conical sharp-pointed protuberance on the top of the head case, which is probably useful whilst forcing its way through the thin pellicle of bark, left by the larva at the end of the tunnel.

The perfect insect appears from December to March. It usually frequents open forest or scrub where its food-plants are often common. It is very active on the wing and sometimes flies with rapidity in the hottest sunshine. When at rest the colour and shape of the wings causes the insect to closely resemble a crumpled dead leaf.

This species also occurs in Fiji.

CHAPTER XIII.

THE PTEROPHORIDAE.

The *Pterophoridae* are distinguished by the following characters:—

The maxillary palpi are obsolete. The fore-wings are usually fissured, forming two (rarely three or four) segments; veins 8 and 9 are usually stalked. The hind-wings are without a defined pecten of hairs on the lower margin of cell, on under surface with a double row of short dark spine-like scales on lower margin of cell; vein 5 remote from 4, 7 remote from 6, shortly approximated to 8 beyond origin, wing usually fissured forming three segments. (See Plate E., figs. 4-9). The legs are very long and unusually slender.

This very distinct family comprises a number of beautiful insects, popularly known as Plume Moths. Although universally distributed, and including altogether a very considerable number of species, it is nowhere very prominent. The larvae are stout, hairy, sluggish in habits, living exposed on the leaves of their food-plant. The pupae are very remarkable, being coloured like the larvae and usually attached by the tail, much after the manner of the pupae of certain butterflies.

The perfect insects mostly fly about sunset.

The family is represented in New Zealand by the three following genera:—

1. PLATYPTILIA.
2. ALUCITA.
3. STENOPTILIA.

Genus 1.—PLATYPTILIA, Hübn.

Forehead usually with tuft of scales. Fore-wings bifid, segments moderate, 8 and 9 stalked. Hind-wings trifid, third segment with black scales in dorsal cilia, sometimes barely traceable. (Plate E., figs. 7, 8 neurulation of *Platyptilia falcatalis*; fig. 9 head of ditto.)

An extensive and cosmopolitan genus. The larvae are usually attached to species of *Compositae*.

We have six species in New Zealand, of which three are confined to the South Island.

PLATYPTILIA FALCOTALIS.

(*Platyptilus falcatalis*, Walk., Cat. xxx, 931; *Platyptilus repletalis* ib., 931; *Platyptilia falcatalis*, Meyr., Trans. N.Z. Inst., xvii., 128; *P. isoterma*, Meyr., ib. xli., 10; *P. pulverulenta*, Philp., ib., liv., 149; *P. ferruginea*, Philp., ib., liv., 150 and lv., 209.)

(Plate XXIII., fig. 7 ♂; 8 ♀.)

This fine species has occurred commonly on Mount Egmont, at Wellington, Otira River, Christchurch, Dunedin, Lake Wakatipu, and Invercargill and is probably generally distributed throughout the country.

The expansion of the wings is usually slightly under 1 inch. The fore-wings are reddish-brown with numerous small, faint, diagonal darker brown stripes, plainer near the dorsum; there is a triangular black mark just before the cleft; a yellowish patch on the first plume; then a small black mark across each plume; followed by two diagonal, cream coloured marks and a dark brown terminal shading. The hind-wings are greyish-brown; the cilia also greyish-brown except on the dorsal edge of the third plume where a number of heavy black scales are situated.

This species is very closely allied to *Platyptilia aeolodes*, but is a larger and brighter-looking insect. The pale markings on the plumes of the fore-wings are much more conspicuous, and the heavy black scales in the terminal cilia of the hind-wings more numerous.

A smaller and very much brighter form of this insect, found on Mount Arthur, with the whole of the fore- and hind-wings clouded with reddish, has been described by Mr. Philpott, as a distinct species, under the name of *Platyptilia ferruginea*. *P. pulverulenta*, Philp., is stated to have the usual transverse markings on the digits of the fore-wings absent, the colour, beyond the large black triangular mark at the base of the digits, being yellowish-brown on the upper digit, and rosy brown on the lower digit. *P. isoterma* Meyr., is stated to be distinguished by the strong black entire line at the base of the terminal cilia of the fore-wings.

P. repletalis is regarded by Mr. T. Bainbrigge Fletcher as a distinct species and is stated by him to differ from *P. falcatalis* in its longer palpi and paler space at base of cilia of second segment of fore-wing. See Trans. Ent. Soc. Lond., 1925, p.p. 603-607.

The perfect insect appears from November till March, and is usually found in localities where the Koromiko (*Veronica salicifolia*) is abundant. It is more frequently met with in the late summer and autumn.

PLATYPTILIA AEOLODES.

(*Platyptilia aeolodes*, Meyr., Trans. Ent. Soc. Lond.; 1902, 278; Trans. N.Z. Inst., xli., 10.)

(Plate XXIII., fig. 14 ♀.)

This insect has occurred at Auckland, Swanson, Waimarino, Waiouru, Taupo, Wellington, Christchurch, Springfield, Castle Hill, Lake Wakatipu, Invercargill and on the Auckland and Chatham Islands. It is probably a very generally distributed species.

It differs from *P. falcatalis* in the following respects:

It is *smaller and darker*; the termen of the second digit of the fore-wings is prominently angulated (in *P. falcatalis* the margin is somewhat bent but not angulated); the principal dorsal scale tuft of the hind-wings is situated hardly beyond the middle, whereas in *P. falcatalis* it is much broader and placed considerably beyond the middle.

This species varies slightly in size and in the intensity of the markings.

The larva, which is about $\frac{3}{4}$ inch long, has the anterior segments stout, gradually tapering posteriorly. Its general colour is dull green, with a series of red patches on the back forming an irregular dorsal band; there are two narrow white lines on each side of this and a series of small warts on each segment, every wart bearing a tuft of stout bristles. The foodplant is apparently *Juncus tenuis*, a common plant in all swampy situations.

The pupa, which is suspended by the tail, is pale dull green with blackish mottling on the limbs; the back is pinkish-green; there are two large hooked projections on the mid-back. The length is slightly over $\frac{1}{4}$ inch.

The perfect insect appears from November till February. It usually frequents grassy places near forest or scrub, and flies with considerable rapidity when disturbed. It is sometimes met with in the middle of winter.

PLATYPTILIA HELIASTIS.

(*Platyptilia heliastis*, Meyr., Trans. N.Z. Inst., xvii., 129.)

(Plate XXIII., fig. 13 ♀.)

This species has occurred at Mount Arthar (Nelson), Castle Hill, Humboldt Range and Mount Earnslaw, Lake Wakatipu, at elevations ranging from 2,500 to 4,000 feet above the sea-level.

The expansion of the wings is about $\frac{3}{4}$ inch. *The fore-wings are bright orange brown* with a dark brown dot just before and below the cleft; the cilia are dark reddish-brown. The hind-wings and cilia are pale reddish-grey; the dorsal margin of the third plume is fringed with coarse brown scales, from the base to $\frac{1}{4}$.

This species may be immediately recognised by the *absence of the dark brown costal triangle* and other markings.

The perfect insect appears in January, and frequents mountains. It is usually found amongst sub-alpine veronias, which often grow in profusion on mountain slopes at elevations of about 3,500 feet, and in such localities it is sometimes fairly common. When resting in the usual "T-like" position on the veronica stem, the wings exactly resemble, in shape and colour, two dead leaves diverging from the stem.

PLATYPTILIA DEPRIVATIS.

(*Platyptilia deprivatalis*, Walk. Brit. Mus. Cat. xxx., 946; *Platyptilia hausti*, Feld. Reis. Nov., pl. exl., 58; Meyr., Trans. N.Z. Inst., xvii., 128; *P. deprivatalis*, ib., xxxix., 113.)

(Plate XXIII., fig. 2 ♂.)

This very beautiful and distinct species has occurred on the Mount Arthar Tableland at an elevation of about

4,200 feet, on Ben Lomond Lake Wakatipu, and at Invercargill near the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. *The fore-wings are very pale yellowish-white with black markings*; there is a more or less distinct series of black marks on the costa, from the base to $\frac{3}{4}$, often obscured by a brown shading; a *large triangular black spot at $\frac{1}{4}$ with a pointed apex reaching beyond the middle of the wing*; an oblong spot on the costal edge of the first plume and a brownish mark at the apex; a curved blackish-brown mark in the middle of the second plume and a sharp black terminal line; a few irregular black marks and brown dots on the dorsum before the cleft. The hind-wings are dark brownish-grey with purple reflections; *there is a small tuft of dense scales in the cilia on the middle of the dorsum of the third digit*. The legs and body are pale yellowish-white with the joints marked in black.

The perfect insect appears from October till May. Generally speaking it seems to be a rare and local species, though common in the extreme south, where it has been taken in some numbers on the flowers of the ragwort (*Senecio*). The peculiar colouring of this species has, I am fully convinced, been specially acquired for protective purposes whilst frequenting the common branching grey lichen (*Usnea barbata*), which grows very freely on tree trunks, especially in elevated or damp localities. When the insect is resting on this plant, with its hind-wings hidden beneath the extended fore-wings, its concealment is almost perfect, the clearly-marked black and white fore-wings, body and legs fitting in with the general appearance of the *Usnea* in a most remarkable and interesting manner.

PLATYPTILIA CAMPSIPTERA.

(*Platyptilia campsiptera*, Meyr., Trans. N.Z. Inst. xxxix. 112.)

(Plate XXIII., fig. 15 ♀.)

This interesting little species was discovered on the Humboldt Range, Lake Wakatipu, at an elevation of 3,600 feet. It has since been found on Ben Lomond.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. *The fore-wings have the cleft from about $\frac{1}{4}$, the upper digit is narrow with the apex pointed, the lower broader expanding towards the termen; very pale yellow*; there are a few minute brown marks on the costa near the base, a *triangular patch just above the cleft and a smaller one just beyond the cleft*; the cilia are whitish-ochreous with a few brown scales on the lower angle of the first digit and on the upper angle and termen of the second digit; there is a conspicuous black scale-tooth on the dorsum at about $\frac{3}{4}$. The hind-wings have the first cleft rather broad, reaching to about $\frac{1}{4}$; *pale pinkish-brown*; the cilia are white, tinged with brownish-red, with a few dark brown scales at the lower angle of the first digit and on the termen of the third digit.

The perfect insect appears from October till January, and frequents rough alpine vegetation on the mountain side, just above the limit of forest trees. When alive and resting with outspread wings the second digit of the fore-wings is held almost at right angles pointing downwards from the first digit. This remarkable characteristic appears to be unique, but there is no doubt as to the accuracy of the observation.

PLATYPTILIA CELIDOTA.

(*Stenoptilia celidota*, Meyr. Trans. N.Z. Inst., xvii., 125.)

(Plate XXIII., fig. 3 ♂.)

This very delicate-looking species has occurred at Palmerston North, Christchurch and Lake Wakatipu.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings have the costa almost straight, the upper digit acutely-pointed and the lower slightly dilated; *pale greyish-ochreous*; there is a series of very faint brownish marks on the costa and dorsum and an *elongate, oblique, dark brown mark just before the cleft*; the termen is slightly tinged with brown; there are minute tufts of dark brown scales in the cilia on each side of the outer portion of the cleft and along the dorsum. The hind-wings are greyish-ochreous, slightly darker than the fore-wings.

The perfect insect appears in November and December and again in April. It frequents open grassy places near forest but appears to be very local. This species is also widely distributed in Australia.

As this insect has distinct black scales in the dorsal cilia of the hind-wings it is here placed in the genus *Platyptilia*.

Genus 2.—ALUCITA, Linn.

Forehead without tuft. Fore-wings bifid, segments narrow, vein 2 sometimes absent, 3 absent, 8-10 absent, 11 sometimes absent. Hind-wings trifold, third segment without black scales in dorsal cilia; 3 absent. (Plate E., figs. 4, 5 neuration of *Alucita monospilalis*; fig. 6 head of ditto.)

Fairly extensive, but mainly located round the shores of the Mediterranean; some of the species range very widely. The four New Zealand species seem to be of Indo-Malayan affinity, but are all endemic.

ALUCITA MONOSPILALIS.

(*Acipitilus monospilalis*, Walk., Cat., xxx., 950; *Acipitilia monospilalis*, Meyr., Trans. N.Z. Inst., xvii., 124; *Acipitilia patrucus*, Feld. Reis. Nov., pl. cxi., 56.)

(Plate XXIII., fig. 5 ♂; 6 ♀; Plate II., fig. 29 larva;

fig. 28 pupa.)

This very beautiful insect is common in most localities in both islands and seems to be generally distributed throughout the country, but is rare in the extreme south of the South Island although fairly common in Stewart Island.

The expansion of the wings is slightly under 1 inch. *The whole insect is pure snow white with the exception of the basal portions of the front legs, a few minute dots on the costa of the fore-wings, a large dot in the fissure of the fore-wings and a smaller dot on the termen before the middle, which are all dark brown or black.*

There is considerable variation in the size and number of the minute blackish, or dark brown markings on the fore-wings. Specimens are also occasionally found with a very fine brown line along the dorsal margin of the upper digit of the fore-wings. These individuals somewhat approach *A. lycosema*.

The larva, which feeds on *Schefflera digitata*, is slightly under $\frac{1}{2}$ inch in length, rather flattened, broad, tapering posteriorly, with the segmental divisions distinct; the head

is yellowish-green, the rest of the larva bright clear green or dull green; there is a series of long tufts of reddish-brown bristles round each segment, longer on the second, twelfth and thirteenth segments; in addition there are numerous tufts of short white bristles on the lower portions of the larva; there is a fine darker dorsal line and cloudy sub-dorsal lines, and sometimes two rows of black blotches with white dots on segments 6 to 12 inclusive; the spiracles are bright orange-brown. This larva is sluggish in habit, clinging tightly to the surface of the leaf and feeding on the green fleshy portion. The pupa is about five-sixteenths of an inch in length, rather pale green, or bluish-green, often much paler on the wing-cases; there is a conspicuous row of tufts of bright orange-brown bristles round each segment becoming white on the ventral surface; the eye-case is blackish; there are several long whitish bristles on the head. It is attached by the tail, the whole ventral portion of the pupa resting on a leaf.

The perfect insect appears from November till March, and frequents forests from the sea-level to 4,000 feet. It is sometimes seen abroad in the middle of winter, and I once observed a specimen, in a natural state, which had just emerged from the pupa, as late as 17th May. Whether noticed at rest, or flying through the forest, this species has a most graceful appearance and must certainly rank as one of the most charming of our native Lepidoptera. Stainton thus referred to the emergence of a very similar British species (*Alucita pentadactyla*). "It is a startling spectacle to see one of these little creatures burst into life, for the insect is more nearly developed than is generally the case, the wings have but little to grow, and its robes of virgin white seem so typical of angelic purity that one seems to witness a resurrection."

ALUCITA LYCOSEMA.

(*Acipitilia lycosema*, Meyr., Trans. N.Z. Inst., xvii., 124.)

(Plate XXIII., fig. 18 ♀.)

This species is common and generally distributed throughout the country, but is rarer in the extreme south. It has also been taken at Stewart Island.

The expansion of the wings is barely 1 inch. The fore-wings have the costal edge white almost to the apex; *there is a broad, dark brown longitudinal stripe from the base to the end of the first plume; the second plume is white with two minute brown marks near the middle, and occasionally a spot near the apex.* The hind-wings and the cilia of all the wings are snowy white. *There is a faint brown band across the thorax but the rest of the body is white.*

This species varies slightly in size as well as in the intensity of the brown stripe on the fore-wings.

The life-history resembles that of *Alucita monospilalis*.

The perfect insect appears in December, January and February, and frequents forest.

Mr. Creagh O'Connor informs me that he has captured a specimen of this insect paired with a typical example of *A. monospilalis*. It would thus appear almost certain that the two forms belong to the same species.

ALUCITA FURCATALIS.

(*Acipitilus furcatalis*, Walk., Cat., xxx., 950; Feld. Reis. Nov., pl. xli., 52; *Acipitilia furcatalis*, Meyr., Trans. N.Z. Inst., xvii., 123.)

(Plate XXIII., fig. 17 ♀; Frontispiece, fig. 25 egg.)

This pretty insect has occurred at Auckland, Hamilton, Palmerston North, Makotuku, Wellington, Leslie Track Mt. Arthur, the Otira Gorge and Stewart Island. It is probably generally distributed throughout the country.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are brown with $\frac{3}{4}$ of the costa broadly edged with white, and a small white mark near the middle of the first plume. The hind-wings are snow white. The head is white and the dorsal surface of the thorax and abdomen brown. All the cilia are white except a brown patch near the extremity of the second plume on the fore-wings.

In some specimens the brown markings are much darker than in others.

The perfect insect generally appears from November to March, and frequents dense forests. On very rare occasions specimens have been taken in the middle of winter. *Alucita furcatalis* is sometimes confused with the closely allied *A. lycosema*, but may always be distinguished from that species by the second plume of the fore-wing being entirely brown in place of white. The brown dorsal stripe on the abdomen is also a good distinctive character.

ALUCITA INNOTATALIS.

(*Pterophorus innotatalis*, Walk., Cat., xxx., 945; *Acipitilia innotatalis*, Meyr., Trans. N.Z. Inst., xvii., 124.)

(Plate XXIII., fig. 1 ♂; Frontispiece, fig. 21 egg.)

This interesting little species, which is the smallest plume moth at present known in New Zealand, has occurred at Puketitiri near Napier, Pipiriki (Wanganui River), Masterton, Porirua, Makara, Wellington, Nelson, Otira River, Christchurch, Mount Linton, and Invercargill.

The expansion of the wings is about $\frac{1}{4}$ inch. The fore-wings are yellowish-ochreous. The hind-wings are dark grey. The cilia of all the wings are dark brownish-grey; there are usually one or two minute black dots in the dorsal cilia of the second plume of the fore-wings. The head, body and legs are pale ochreous.

The perfect insect generally appears from October till March, but has also been taken in August, there being apparently two or more broods in the course of a year. It frequents very restricted spots on open grassy, or fern-covered hills where it is often rather common.

Mr. Meyrick remarks that "this species might almost be considered identical with the European *Alucita tetradactyla*, L., which it approaches very closely; but my specimens of *A. tetradactyla* are decidedly larger, the cilia darker and more sharply contrasted, and the costa suffused with light fuscous without trace of black dots in the cilia of lower margin; these differences are very slight, and if intermediate localities produce connecting forms, the two may be united under the name of *tetradactyla* L.; meanwhile it seems well to keep them separate."

Genus 3.—STENOPTILIA, Hübner.

Forehead with horny prominence or tuft of scales. Fore-wings bifid, segments moderate or rather narrow, 8 and 9 stalked. Hind-wings trifid, third segment without black scales in dorsal cilia.

A genus of moderate extent, generally distributed.

Represented in New Zealand by six species, five of which are confined to the South Island.

STENOPTILIA LITHOXESTA.

(*Mimacseoptilus lithoxesta*, Meyr., Trans. N.Z. Inst., xvii., 127.)

(Plate XXIII., fig. 11 ♀.)

This fine species has occurred at Mount Arthur and Arthur's Pass at elevations of from 3,000 to 4,000 feet above the sea-level.

The expansion of the wings is slightly over 1 inch. All the wings are dull brownish-ochreous. The fore-wings have a very narrow, dark brown, band along the costa which is considerably wider and margined with pale ochreous a little before the apex; there is a black dot slightly before and below the cleft. The cilia on the dorsal and terminal edge of the first plume of the fore-wings are white, the rest of the cilia being pale brownish-ochreous. The hind-wings are pale brown with the third plume ochreous.

The perfect insect appears in January. It frequents rough herbage on mountain sides, where it is sometimes fairly common.

STENOPTILIA EPOTIS.

(*Platyptilia epotis*, Meyr., Trans. Ent. Soc. Lond., 1905, 231; Trans. N.Z. Inst., xliii., 73.)

(Plate XXIII., fig. 16 ♀.)

This species, which is very closely allied to the last, has occurred on the Mount Arthur Tableland and the Humboldt Range, Lake Wakatipu, at elevations of from 3,500 to 4,000 feet.

The expansion of the wings is just under 1 inch. The fore-wings are very pale brownish-ochreous; the costa is narrowly edged with dark brown from the base to about $\frac{1}{4}$, thence broadly bordered with creamy white to the apex; the first plume has a very oblique blackish-brown streak from the apex to about the middle of the cleft; there is an extremely minute brown mark just before the cleft. The hind-wings and all the cilia are pale brownish-ochreous.

Varies considerably in the intensity of the oblique apical streak, also in the amount of ochreous in the ground-colour. Apart from the apical streak, the species may be distinguished by the patch of white on the costal cilia towards the apex, and the black mark at the base of the terminal cilia on the lower angle of the first plume, and also in the same position on the first plume of the hind-wings.

The perfect insect appears in February and March, frequenting rough alpine vegetation on the mountain sides. It appears partial to swampy places, but is very local.

I have placed this insect in the genus *Stenoptilia* next to *S. lithoxesta* as the black scales in the dorsal cilia of the hind-wings are, to all intents and purposes, absent.

STENOPTILIA CHARADRIAS.

(*Mimaseoptilus charadrias*, Meyr., Trans. N.Z. Inst., xvii, 126.)

(Plate XXIII, fig. 4 ♂.)

This species has occurred at Arthur's Pass and in the Routeburn Valley near Lake Wakatipu, at elevations ranging from 1,500 to 4,000 feet.

The expansion of the wings varies from $\frac{3}{4}$ to $\frac{5}{8}$ inch. The fore-wings are brownish-ochreous, darker on the costa and much paler on the dorsum; there are a few obscure pale dots on the costa, an elongate blackish mark before the cleft, in the female larger and touching the cleft; the female also has a cloudy, blackish triangular patch below the apex, terminated by a whitish line near the termen; in the male the triangular patch is absent and the whitish line is shaded into the termen; the cilia are pale brownish-ochreous becoming white inside the cleft. The hind-wings and cilia are dark brown.

The perfect insect appears in January. It is a very local mountain species, but often abundant in the restricted localities it frequents. On the Lake Harris track in the Routeburn Valley I noticed that it was attached to a small sub-alpine shrub resembling *Tauhinu* (*Cassinia*).

STENOPTILIA VIGENS.

(*Oxyptilus vicens*, Feld., Reis. Nov., pl. exl., 49; *Stenoptilia vicens*, Meyr., Trans. N.Z. Inst., xlv., 119.)

(Plate XXIII, fig. 9 ♂.)

Apparently a very rare species, having been discovered during the voyage of the Austrian frigate "Novara" in the year 1859, but not again heard of until I captured it on the Humboldt Range at the head of Lake Wakatipu in February, 1911. Since that time it has occurred in the Otira Gorge.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are very pale brownish-ochreous with rich reddish-brown markings; there is a narrow stripe along the costa; a very distinct spot at the base of the cleft; a broad, wedged-shaped patch on the upper digit and a faint reddish-brown shading on the lower digit; there is an ochreous line along the dorsum and two or three thick brown scales in the dorsal cilia. The hind-wings are pale purplish-brown, the last digit being strongly tinged with ochreous.

The perfect insect appears in February, and frequents open grassy slopes on the mountains at elevations of from 2,500 to 3,000 feet above the sea-level.

STENOPTILIA ORITES.

(*Stenoptilia orites*, Meyr., Trans. N.Z. Inst., xvii, 126.)

(Plate XXIII, fig. 10 ♀.)

This very rare species has occurred on Arthur's Pass at about 3,000 feet above the sea-level. It has also been

taken near Clinton and on Ben Lomond at an altitude of about 2,500 feet.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are dull greyish-ochreous; there is a series of obscure blackish bars on the costa; two discal dots, the first at $\frac{1}{4}$, the second before and below the base of the cleft; an elongate discal shading; two cloudy stripes on the first digit, which is very narrow and two blackish patches on the second digit. The hind-wings are pale brownish-grey. All the cilia are dusky grey. The palpi are very long with a dark streak on the outer side of each. The head, thorax and abdomen are dull greyish-ochreous, the last-named with a series of blackish marks on the edges of the posterior segments.

The perfect insect appears from November till March, and frequents open tussock country. When at rest all the plumes are folded closely together and the wings are thus much reduced in width. If disturbed it drops, as though dead, amongst the roots of the grass or in the net, and as it then closely resembles a short length of dried tussock, it, no doubt, very often escapes detection.

STENOPTILIA ZOPHODACTYLA.

(*Stenoptilia zophodactyla*, Dup., Hist. Nat. Lep. Fr., ii, 314; *canalis* Walk., Cat., xxx., 944.)

(Plate XXIII, fig. 12 ♀.)

This pretty species has occurred in the neighbourhood of Wellington, and near Christchurch, but seems to be a rare insect.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings have the costa very strongly arched before the apex, both digits rather acutely pointed, the lower with its outer margin very oblique; dull brownish-grey very faintly speckled with black and white and with slight bronzy reflections; there is a minute discal dot at $\frac{1}{4}$ and a larger black spot at the cleft and sometimes two minute black dots on the outer margins of each digit. The hind-wings are dark grey thickly sprinkled with bronzy-brown dots. The cilia of all the wings are brownish-grey, with slight bronzy reflections.

Apparently varies slightly in the depth of the colouring, some specimens being duller and greyer than others.

The larva, which has never been observed in New Zealand, is yellowish-green or brownish-yellow with the dorsal line reddish, sometimes purple or darker green; the sub-dorsal line is sometimes pale purplish, or pale yellowish. It feeds on the flowers of *Erythraea centaurium* (Meyrick).

The perfect insect appears in November and again late in March. It frequents open, grassy places in the neighbourhood of cultivation, and has possibly been artificially introduced perhaps quite recently. Its geographical range is a wide one, comprising Eastern Australia, India, Europe, Africa and South America.

CHAPTER XIV.

THE PSYCHIDAE.

The *Psychidae* are distinguished by the following characters:—

No tongue. No maxillary palpi. Antennae short, in male bipectinated. Fore-wings with vein 1 furcate, posteriorly coalescing with vein-like sub-median fold; veins 8 and 9 stalked. Hind-wings with frenulum developed, vein 1c present; vein 8 connected by bar with upper margin of cell. Female apterous, without legs or developed antennae. (Plate A., figs. 20, 21, neuration of *Oeceticus omnivorus*.)

A small family of universal distribution, but commoner in warm countries. The male imago has thinly scaled wings, without markings; its flight is strong and swift, sometimes in sunshine. The female is almost wholly helpless; the abdomen is at first greatly distended with eggs, and ultimately shrivels up.

The egg is oval, smooth. The larva inhabits a strong portable silken case, covered with fragments of stick or refuse. The pupa is enclosed within the larval case.

Although of dull and inconspicuous appearance, the insects comprised in this family are exceptionally interesting in their habits and the completely helpless condition of the females is most remarkable. Two genera occur in New Zealand, each represented by a single species:—

1. *OECETICUS*.
2. *OROPHORA*.

Genus 1.—*OECETICUS*, Guild.

Ocelli present. Antennae $\frac{3}{4}$, in male strongly bipectinated, much more shortly on apical half. Labial palpi extremely short, rough-haired. Abdomen in male very elongate, roughly hairy. Legs hairy, tibiae without spurs, posterior tarsi extremely short and stout. Fore-wings with veins 4 and 5 short-stalked, 7 sometimes out of 9, 8 and 9 stalked, forked parting-vein well defined. Hind-wings with veins 4 and 5 connate, 8 connected by bar with cell beyond middle. An additional vein (9) rising from 8 before bar. (See Plate A., figs. 20, 21.)

This generic name was wrongly spelt *Oiketicus* by its originator and others.

OECETICUS OMNIVORUS.

(*Liothula omnivora*, Fereday, Trans. N.Z. Inst. x., 260, pl. ix.
Oeceticus omnivorus, Meyr., Trans. N.Z. Inst. xxii., 212.)

(Plate XLIV., fig. 14 ♂; Plate III., fig. 25, larva in its case.)

This interesting species is seldom seen as an imago in the natural state, although the cases constructed by its larva are of common occurrence. Specimens of these cases have been noticed at many localities between Kaero, north of Auckland, in the North Island, and Invercargill, in the

South Island, so that apparently the insect is common, and generally distributed throughout New Zealand.

The expansion of the wings of the male is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. The fore-wings are very elongate and narrow. All the wings are blackish-brown, and sparsely covered with scales, the hind pair being semi-transparent. The body is very hairy, and deep black. The antennae are broadly bipectinate at the base, becoming almost filiform towards the apex. The female insect is apterous, having a close superficial resemblance to a large maggot. The head and thorax are very small, and the legs and antennae rudimentary. The extremity of the body is furnished with a two-jointed ovipositor, and there are a few scattered yellowish scales on various parts of the insect. Its length is about 1 inch.

About midsummer the eggs of this species are deposited inside the old case, which the female insect never leaves during the whole of her life. The young larva when first hatched is about $\frac{1}{8}$ inch in length. Its head and three anterior segments are corneous and much larger than the others, which are rather soft with the exception of the last one. These little larvae are extremely active, and immediately after hatching leave the old case, and roam in all directions over the tree, letting themselves down from branch to branch by silken threads. They carry the posterior portion of their body elevated in the air, walking whilst doing so by means of their strong thoracic legs. These young larvae are met with in the late summer and autumn and do not become full-grown until towards the end of the winter.

The foodplants of this species are very numerous. The following are a few of them: Manuka (*Leptospermum scoparium* and *ericoides*), Willow, Broom, *Cupressus macrocarpa*, *Pinus radiata*, *Cassinia*, *Dracophyllum longifolium*, etc., etc. These, it will be observed, include several introduced trees. In fact, the insect is a very general feeder. About three days after leaving the egg, the little caterpillar constructs a minute conical, silken case, which it carries almost in an upright position on its posterior segments. Later on in life this case becomes too heavy to be held vertically, and is afterwards dragged along by the larva, and often allowed to hang downwards. The case has two apertures—a large one in front, through which the head of the larva is projected, and a smaller one at the posterior extremity, which allows the pellets of excrement to fall out of the case, as soon as they are evacuated.

Owing to the apterous and completely helpless condition of the female imago, it is evident that the dispersal of this insect must take place in the larval state. Distribu-

tion is of course quite impossible without a female being transported in some way, and from observations made on a good many larvae of various ages, I am disposed to think that the migration of this insect to new localities takes place at an early age, possibly soon after its emergence from the egg. On this account I think that the occurrence of the moth in both North and South Islands is of great interest, as it would seem to indicate the existence of some connection between the two islands, at a period not sufficiently remote to have allowed any appreciable modification to take place in the insect's structure and habits. At the same time, it should be borne in mind, that the protection afforded the larva by its case, and its ability to feed on so many different plants, may have rendered any modification unnecessary for the preservation of the species during recent times. The length of the full-grown caterpillar is about 1 inch. The head is dull yellow speckled with black. The first three segments are very hard, dark brown, with numerous white markings. The remaining segments are considerably thickened near the middle of the insect, rudimentary prolegs being present on the seventh, eighth, ninth, and tenth segments of the larva. The anal prolegs are very strong, and are furnished with numerous sharp hooklets, which retain the larva very firmly in its case. As the caterpillar grows, it increases the length of its domicile from the anterior, causing it gradually to assume a more tubular form, tapering towards the posterior aperture, which is enlarged from time to time. The outside is covered with numerous fragmentary leaves and twigs of various sizes, placed longitudinally on the case; and, frequently, near the anterior aperture, the materials, owing to their recent selection, are fresh and green. In rare cases moss or even stones are attached. The interior is lined with soft, smooth silk of a light brown colour, the thickness of the whole fabric being about the same as that of an ordinary kid glove, and so strong that it is impossible to tear it, or indeed to cut it, except with sharp instruments. The size of the case, when the caterpillar is mature, varies considerably, ranging from $2\frac{1}{4}$ to 3 inches or more in length, and about $\frac{1}{4}$ inch in diameter, the widest portion being a little behind the anterior aperture.

During the day the larva closes the entrance, and spins a loop of very strong silk over a twig, the ends being joined to the upper edges of the case on each side; in this way it hangs suspended, the caterpillar lying snugly within. I have often known a larva to remain thus for over three weeks without moving, and afterwards resume feeding as before; this probably occurs whilst the inmate is engaged in changing its skin. At night the larvae may be seen busily engaged: they project the head and first four segments of the body beyond the case, and walk about with considerable rapidity, often lowering themselves by means of silken threads; the only locomotive organs are, of course, their strong thoracic legs, which appear to easily fulfil their double function of moving both larva and case. If disturbed, these insects at once retreat into their cases, closing

the anterior aperture with a silken cord, which is kept in readiness for the purpose, and pulled from the inside by the retreating larva. This operation is most rapidly performed, as the upper edges of the case are flexible, and thus fold closely together, completely obstructing the entrance. When full-grown, this caterpillar fastens its case to a branch with a loop of strong silk, which is drawn very tight, preventing the case from swinging when the plant is moved by the wind, and also rendering the insect's habitation more inconspicuous, by causing it to resemble a broken twig. The anterior aperture is completely closed, the loose edges being drawn together and fastened like a bag. The posterior end of the case is twisted up for some little distance above the extremity, thus completely closing the opening there situated. It is lined inside with a layer of very soft silk spun loosely over the sides, and partly filling up each end. In the centre of this the pupa lies with its head towards the lower portion of the case, the old larval skin being thrust backwards amongst the loose silk above the insect.

The male and female pupae may very easily be distinguished. The male pupa is rather attenuated, and has all the organs of the future moth plainly indicated on the integument, as is usual with Lepidopterous pupae. The female pupa, on the contrary, is merely a chain of segments, with a few faint indications of rudimentary organs on the anterior extremity. It is, moreover, much larger than the male pupa.

The insect remains in this condition during the late winter months. About September the male pupa works its way down to the lower end of the case, forces open the old aperture there situated, and projects the head and thorax, the pupa being secured from falling by the spines on its posterior segments, which retain a firm hold in the silk. Its anterior portion then breaks open, and the moth makes its escape, clinging to the outside of its old habitation, and drying its wings.

The male insect must be on the wing from September till December, but is very rarely observed, although stragglers have been detected during the winter months. In captivity it is extremely active when first emerged. Indeed the male moth is so vivacious, that it often happens, owing to the emergence usually taking place very early in the morning, specimens are more or less injured by their efforts to escape, before they are discovered in the breeding cage. This restless energy of the male is no doubt essential to the insect's well-being, as the females, hidden away in their cases and incapable of any movement, must of necessity be very hard to discover. The power of locomotion lost in the one sex is thus doubled in the other. Considering the protection afforded this insect by the case, which it inhabits during its preparatory stages, its enormous mortality from the attacks of a parasitic dipteron (*Phorocera marginata*) is very remarkable. In this connection the following analysis of 38 cases, gathered at random, may be of interest:—

- 26 had parasites.
- 8 were dead.
- 2 contained eggs.
- 2 contained living pupae, 1 male and 1 female respectively.

In addition to the above-named dipteran the fine ichneumon-fly (*Echthromorpha intricatoria*) has been reared from the larva of the present insect.

Genus 2.—OROPHORA, Fereday.

Ocelli present. Antennae two-fifths, in male moderately bi-pectinated throughout. Labial palpi rudimentary, hairy. Abdomen densely hairy. Fore-wings with veins 4 and 5 short-stalked, 7 and 8 out of 9. Hind-wings with veins 4 and 5 stalked, parting-vein well defined, 8 connected by bar with cell beyond middle, an additional vein (9) rising out of 8 before bar.

OROPHORA UNICOLOR.

(*Psyche unicolor*, Butl., Proc. Zool. Soc., London, 1877, 381.

Orophora toumatou, Fereday, Trans. N.Z. Inst. x. 262, pl. ix. *Orophora unicolor*, Meyr., Trans. N.Z. Inst. xxii. 212.)

(Plate XLIV., fig. 9 ♂; Plate III., fig. 18 case of larva.)

This odd-looking little insect was discovered by Fereday at Rakaia.

The expansion of the wings is hardly 1 inch. All the wings are rather broad, rounded, and very sparsely covered with dusky brown hair-like scales; the body is very hairy, and the antennae are slightly bi-pectinated. The female is apterous.

The life-history was thus described by Fereday: "I have never seen the larva. Its case measures in length about 16 lines (1½ inches); the exterior is covered with pieces of stems of grass from a line to 5 lines in length, laid longitudinally and in the manner of thatch; the interior is thinly lined with fine silk. The cases are found fixed to the twigs of the Wild Irishman (*Discaria toumatou*), but it may be inferred from the covering of the case, that it probably does not feed on the shrub but upon the tussock grass, generally growing where the shrub is found. It is some years since I found the cases on *Discaria toumatou*, growing in the river-beds of the Rakaia and Waimakariri, on the Canterbury Plains, and I did not find any case in its earlier stage before the larva had fed up and changed into the pupa state."^{*}

All Fereday's specimens were bred from the cases, and to the best of my belief no one has ever observed the insect on the wing. Cases constructed by the larva have, however, been recently found, by Mr. Charles E. Clarke, at Mount Ida, Central Otago.

^{*}Trans. N.Z. Inst. x. (1877), 262.

CHAPTER XV.

THE TORTRICIDAE.

The *Tortricidae* are characterized as follows:—

The head is covered with dense erect scales. The ocelli are usually present. The antennae are less than $\frac{3}{4}$ the length of the fore-wings. The labial palpi have the second joint more or less rough-scaled and the terminal joint rather short and obtuse. The tibiae have all the spurs present, usually long. The fore-wings have vein 1b strongly furcate at base, 1c more or less developed and veins 3, 4 and 5 more or less approximated. The hind-wings with a frenulum; vein 1b with a well-developed basal furcation, 1c usually present; veins 6 and 7 are usually approximated or stalked, 8 approximated to anterior half of upper margin of cell, sometimes connected with it, thence diverging. (See Plate E., figs. 10-40 and Plate F., figs. 1-24.)

This is a very large family, everywhere present, but much more characteristic of temperate regions than of tropical. The species are usually of small size.

The larvae are rather elongate, with few hairs, with 16 legs, living concealed in rolled or joined leaves, or spun shoots, or in stems or flower heads or roots. Usually there are no markings; hence the leaf-feeding species, being often very polyphagous, are hardly to be discriminated. The head is often black when young, and light coloured later.

The pupa is protruded from the cocoon in emergence, and is usually in the situation where the larva fed. Segments 8-12 are free in the male, 8-11 in the female.

In the males of many species the basal portion of the costa of the fore-wings is folded over above and often includes some expansible hairs (probably a scent-organ); this is termed the costal fold.

The study of this extensive family offers considerable difficulties, owing to the great variability of many of the species, and also their close similarity in general appearance. In these respects the present family is only excelled by the *Noctuidae*, which, as already explained, unquestionably presents the greatest difficulties of any family of Lepidoptera. Many of the Tortricids are somewhat attractive insects. The prevailing colours of the fore-wings are warm brown, red or yellow, and of the hind-wings pale ochreous or white, frequently more or less spotted with grey. Most of the species rest with the fore-wings flat, slightly overlapping, the entire insect being thus somewhat oblong, or bell-shaped, the head forming the narrow top of the bell. This peculiarity is, however, only evident in those species having broad wings. Generally speaking, the Tortricids are about in the imago state for a longer period than most Lepidoptera, and in some of the very common species there appears to be a continuous succession of individuals throughout the year. Only a few species are strictly diurnal

in their habits, the majority flying freely in the late afternoon, or at sunset. The colouring is protective, usually assimilating closely to the varied tints of fading or dead leaves, and the value of this protection is greatly enhanced, by a common habit of resting amongst fallen leaves and litter on the surface of the ground. A very few species imitate lichens, bird-droppings, or moss, and these are usually found resting on tree trunks or fences.

The *Tortricidae* are represented in New Zealand by three following sub-families:—

1. CARPOSINIDES.
2. TORTRICIDES.
3. EUCOSMIDES.

Sub-family 1.—CARPOSINIDES.

Ocelli absent. Fore-wings with tufts of scales on surface; 2 from posterior fifth of cell, 7 to termen, separate. Hind-wings with or without cubital pecten; 5 absent, 6 usually absent or rudimentary, parallel to 7 when present, 7 to apex.

Easily known by the peculiar neururation of hind-wings. There are six Australian genera, but only one occurs in New Zealand. (See Plate E., figs. 10, 11 neururation of *Carposina eriphylla*.)

Genus 1.—CARPOSINA, H. S.

Antennae in male with moderate or long ciliations (1-4). Palpi long or very long, porrected, second joint with projecting scales above and beneath, terminal more or less concealed. Fore-wings with vein 8 separate. Hind-wings with cubital pecten, in male sometimes not developed; veins 3 and 4 stalked, 6 absent. (Plate E., figs. 10, 11 neururation of *Carposina eriphylla*; fig. 12 head of ditto.)

Principally characteristic of the Hawaiian Islands and Australia with stragglers in North America and Europe.

We have fourteen species in New Zealand. Of these three are confined to the North Island; six to the South Island, and five common to both islands.

CARPOSINA CONTACTELLA.

(*Tinea contactella*, Walk., Cat. xxxv., 1813; *Heterocrossa contactella*, Meyr., Trans. Ent. Soc. Lond., 1905, 235.)

(Plate XXII., fig. 21 ♀.)

This little species has occurred in the North Island at the Wanganui River, Paekakariki and Wellington and in the South Island at Otira River, Ida Valley, Queenstown, Invercargill and Bluff.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are greyish-white more or less thickly speckled with

blackish-grey towards the dorsum; there are three or four minute black marks on the costa near the base, the second forming an oblique stripe; a rather large, narrow, oblique, pale ochreous spot edged with black below middle at $\frac{1}{2}$; a black dot above middle of disc and a small pale ochreous, sometimes blackish-mixed spot, below it; three small faint whitish-ochreous spots arranged in a triangle in the disc beyond the middle and ringed with white. An indefinite angulated sub-terminal shade marked with black on the veins; a series of blackish dots on apical half of costa and termen; the cilia are grey faintly barred with white. The hind-wings are pale grey with paler cilia.

There appears to be considerable variation in the distinctness and presence or absence of many of the markings and I am consequently not yet able to clearly separate the closely allied forms described as *C. amalodes* and *C. sarcanthes*.

The perfect insect appears in December and January, and frequents light forest or scrub, especially *Leptospermum*. It is usually a rare species.

CARPOSINA AMALODES.

(*Carposina amalodes*, Meyr., Trans. N.Z. Inst., xliii., 61.)

This species was described from specimens taken at Otira River, where it is fairly common. It is stated to differ from *Carposina contactella* "in the forewings, which are rather broader with the termen less straight and somewhat less oblique; in the black costal spot beyond $\frac{1}{2}$ and preceding sub-costal dot (both of which are absent in *contactella*), and in the less grey hind-wings." (Meyrick.)

The perfect insect appears in December and frequents forest.

CARPOSINA SARCANTHES.

(*Carposina sarcanthes*, Meyr., Trans. N.Z. Inst., l. 133.)

This species, which appears to be very similar to the somewhat variable *Carposina adreptella*, is stated to be specially characterized by the pale pinkish-ochreous basal half of hind-wings. At present it is only reported from Wellington.

CARPOSINA THALAMOTA.

(*Heterocrossa thalamota*, Meyr., Trans. N.Z. Inst., xli., 12.)

(Plate XXII, figs. 25 and 26 varieties.)

This rather obscurely-marked species was discovered by Mr. Philpott at Invercargill and has also occurred at Wyndham.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rather elongate with the termen oblique; very pale purplish-grey irregularly clouded with pale brownish-ochreous and usually very heavily and irregularly sprinkled with dark grey scales; there are four obscure black-edged pale brown discal spots with a very conspicuous oblong black discal patch between them. The hind-wings are very pale greyish-white.

This insect seems to be very variable. In some specimens the ground colour is pale ochreous-brown with little

or no dark grey suffusion; the dark oblong discal patch is, however, a good distinctive character.

The perfect insect appears from December till February and frequents forest.

Described and figured from specimens in Mr. Philpott's collection.

CARPOSINA ADREPTELLA.

(*Glelechia adreptella*, Walk., Cat. xxix., 654; *Paramorpha adreptella*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 698; *Heterocrossa adreptella*, Meyr., Trans. N.Z. Inst., xv., 66.)

(Plate XXII, fig. 22 ♂.)

This rather inconspicuous species has occurred at Hamilton, Cambridge, Ashhurst, Wellington, Takaka, Christchurch, Lake Wakatipu, and Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are narrow with the apex rather pointed dull brownish-ochreous with blackish-grey markings; there are about seven small spots on the costa; a rather large spot with a tuft of raised scales in the disc at about $\frac{1}{2}$ from the base; between this and the base there are a number of minute dots irregularly arranged on the upper half of the wing; there is an angulated transverse series of blackish dots from $\frac{1}{2}$ of the costa to the tornus and a terminal row of similar dots. The hind-wings are white faintly clouded with grey at the tips.

According to Fereday the larva feeds in the stems of the garden raspberry and its natural foodplant is therefore doubtless the wild *Rubus*. It has also been found feeding in the shoots of the introduced *Rubus*.

The perfect insect appears from September to March, and frequents forest. It seems to be fairly common in some localities, though scarce in others.

CARPOSINA IOPHAEA.

(*Heterocrossa iophaea*, Meyr., Trans. N.Z. Inst., xxxix., 118.)

(Plate XXII, fig. 24 ♂.)

This very distinct little species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also occurred at Wyndham and in the North Island, at Whakapapa, Mount Ruapehu.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are narrow, elongate with the termen oblique, dark purplish-grey speckled with very pale grey; three tufts of raised scales, edged first with black and then with white, are placed very obliquely at the base; an irregular line of four similar tufts at $\frac{1}{2}$; and a series of five tufts arranged round the middle of the wing which is sometimes darker; there is a row of dark grey marks on the costa and termen and a cloudy sub-terminal shading. The hind-wings are dull greyish-ochreous.

The perfect insect appears from October till February, and frequents forest. Mr. Philpott informs me that it is generally found on the trunks of white pines and similar trees. It displays the usual habit of the genus of alighting on the ground and taking refuge amongst the twigs and dead leaves. The shape the insect assumes with folded wings facilitates its secretion into any small crevice.

CARPOSINA CRYODANA.

(*Heterocrossa cryodana*, Meyr., Trans. N.Z. Inst. xvii., 148.)

(Plate XXII., fig. 19 ♂.)

This species has occurred at Dunedin and Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rather elongate, oblong, with the termen oblique, white, thickly speckled with pale brownish-grey; there is a short black streak from the base just beneath the costa and usually a thick, irregular, black longitudinal streak near the middle of the wing. The hind-wings are white slightly tinged with grey.

The perfect insect appears from September till November, and frequents Manuka scrub (*Leptospermum*). Mr. Philpott informs me that it is very common in the neighbourhood of Invercargill.

CARPOSINA EXOCHANA.

(*Heterocrossa exochana*, Meyr., Trans. N.Z. Inst. xx., 76.)

(Plate XXIV., fig. 7 ♂.)

This very distinct species has occurred at Masterton, Wellington, Nelson, Christchurch, Dunedin and Invercargill.

The expansion of the wings is about one inch. The fore-wings are very elongate with the apex acute and the termen slightly curved and oblique, pale brownish-ochreous, slightly darker between the veins; there is a short brown mark on the costa near the base, several brownish-black spots near the middle, enclosing a more or less cloudy patch, three distinct black dots on the costa before the apex and a sub-terminal series of cloudy black dots becoming obsolete towards the costa and dorsum. The hind-wings are very pale ochreous.

The perfect insect appears from September till May. It is usually taken at light, but is not a common species. As, however, it has a superficial resemblance to some of the common *Crambi* it is probably often overlooked by collectors.

CARPOSINA CHARAXIAS.

(*Heterocrossa charaxias*, Meyr., Trans. N.Z. Inst., xxiii., 98.)

(Plate XXII., fig. 20 ♀.)

As yet this species has only been recorded from Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rather elongate, oblong, with the termen very oblique and slightly waved, white densely speckled with brownish-grey; a small black spot is situated on the costa near the base; a minute black dot on the dorsum near the base; seven small brown spots on the costa; a short oblique black bar in the disc before $\frac{1}{2}$, parallel to the termen; there are several scattered black dots or short marks preceding the tufts; an angulated series of sub-terminal dots obsolete at extremities and a series of very indistinct terminal dots. The hind-wings are white. The palpi are longer in the female than in the male.

The perfect insect appears in November and may be found resting on the stems of manuka (*Leptospermum*) in the Wellington Botanical Gardens, where it is sometimes very common. It is evidently closely allied to *Carposina cryodana*, though apparently quite distinct.

CARPOSINA ERIPHYLLO.

(*Heterocrossa eriphyllo*, Meyr., Trans. N.Z. Inst., xx., 76.)

(Plate XXIV., fig. 52 ♀; Plate I., fig. 19 larva.)

This very large and handsome species has been taken at Ohakune, and is occasionally met with around Wellington.

The expansion of the wings ranges from 1 to $1\frac{1}{2}$ inches. The fore-wings are elongate, slightly dilated towards the termen, which is straight and oblique; pale green with black markings, the spaces between the veins more or less speckled with white; a row of very conspicuous marks on the costa and termen; two small black marks near the base; a very large irregular mark at about $\frac{1}{4}$; there is a conspicuous ring-shaped mark below the costa near the middle with an irregular branching line beneath it, the whole surrounded by a brownish shading; a very irregular series of sub-terminal dots is also present, and the veins are marked in darker green. The hind-wings are white.

Varies considerably in the intensity of the green colouring, which, in bred specimens, inclines to yellowish-brown; in such forms the sealing between the veins is often whitish-ochreous.

The larva burrows under the bark of *Aristotelia racemosa*, usually selecting for this purpose the side burrows formed by the larva of *Hepialus virescens*, where it feeds on the sappy bark and wood of the living tree. It is full-grown about the end of October, emergence taking place in December.

Its length when full-grown is about $\frac{1}{2}$ inch. Cylindrical, slightly tapering at each end with the segments deeply excised. The head is dark reddish-brown, the second segment with shining brown dorsal plate; back of rest of segments bright pink, slightly tinged with purple; ventral surface pale whitish, slightly tinged with blue; there is a row of rather large horny warts around segments 2, 3 and 4; a double series of sub-dorsal warts on the other segments, except the last, and three lateral lines of such warts. The legs and prolegs are well developed.

The pupa is enclosed in a cocoon composed of frass, joined together with silk.

The perfect insect appears from September till April. It frequents forest but is by no means common. It is usually found resting on tree-trunks where its colouring is highly protective amongst green lichens. The similar green and black coloration exhibited by *Izatha peroncanella* (Plate XXV., fig. 54) is very interesting in this respect, as it clearly indicates how a highly specialized type of colouring, has been independently acquired for similar protective purposes, by two species which, in other respects, do not resemble each other.

CARPOSINA GONOSEMANA.

(*Heterocrossa gonosemana*, Meyr., Trans. N.Z. Inst. xv., 67; Proc. Linn. Soc. N.S.W. 1882, 179; *epomiana*, Meyr., Trans. N.Z. Inst. xvii., 149.)

(Plate XXII., fig. 23 ♀.)

This species has occurred at Wellington, Nelson, Otira River, Dunedin, Lake Wakatipu, Invercargill, Stewart Island and Auckland Island. It is probably common and generally distributed throughout the country.

The expansion of the wings is from $\frac{3}{4}$ to $\frac{5}{8}$ inch. The fore-wings are rather narrow with the termen straight and oblique, white very finely speckled with grey scales; there is a short thick black mark on the costa at the base followed by a black dot; a rather broad oblique black mark in the disc at about $\frac{1}{3}$, followed by two raised tufts; six conspicuous short black marks on the costa from $\frac{1}{4}$ to the apex; five small tufts of raised scales near the middle of the wing; an obscure irregular transverse line at about $\frac{1}{2}$; a wavy series of sub-terminal dots and a faint series of terminal dots. The hind-wings are white.

There is considerable variation in the depth and extent of the grey speckling and black markings. Specimens from the extreme southern part of New Zealand and Auckland Island are usually darker in general appearance than those from more northern localities.

The perfect insect appears from November till February, and frequents forest. It is usually found resting on tree-trunks, where it closely resembles a small patch of white lichen. It is probably the commonest and most generally distributed species of the genus.

CARPOSINA MORBIDA.

(*Carposina morbida*, Meyr., Trans. N.Z. Inst., xlv., 120.)

(Plate XXIV., fig. 20 ♀.)

This obscure-looking species was discovered on the banks of the Routeburn at the head of Lake Wakatipu.

The expansion of the wings is slightly over 1 inch. The fore-wings are white, irregularly strewn with pale yellowish-grey scales darker near the costa and in the disc; there are six dark grey costal dots; 5 patches of raised yellow scales in the disc, the outermost forming an oblique bar; a very indistinct series of minute blackish sub-terminal streaks. The hind-wings are white.

In *Carposina exochana*, with which this insect might possibly be confused, the palpi of the male are much longer and porrected.

The perfect insect appears in February, and frequents the clumps of *Gaya Lyallii* (lace bark), which constitute such a conspicuous feature in the Routeburn Valley.

CARPOSINA SANCTIMONEA.

(*Carposina sanctimonca*, Clarke, Trans. N.Z. Inst., lvi., 418.)

(Plate LII., fig. 29 ♀.)

This species was discovered at Arthur's Pass by Mr. C. E. Clarke.

The expansion of the wings is nearly 1 inch. The fore-wings have the costa rather strongly arched, the apex acute, and the termen rather oblique; snow-white, with grey markings; a suffused longitudinal stripe in disc from about $\frac{1}{4}$ to $\frac{3}{4}$; a series of oblique cloudy confluent bars on costa from about $\frac{1}{4}$ to just before apex; a cloudy sub-terminal patch near middle, containing two darker marks; an oval black spot below costa near base, and another slightly beyond this; an indistinct black line and spot in centre of discal longitudinal stripe. The hind-wings, which have the apex acute, are snow-white. The palpi, head and thorax are snow-white; the legs, antennae and abdomen reddish-ochreous.

Distinguished from all similar species by its larger size and predominant white colouring.

The perfect insect appears in January.

Described and figured from specimen kindly lent by Mr. Clarke.

CARPOSINA MACULOSA.

(*Carposina maculosa*, Philp., Trans. N.Z. Inst., lvii., 705.)

(Plate XXVII., fig. 28 ♂.)

This very distinct species was discovered by Mr. S. Lindsay on the Lyttelton Hills, near Christchurch.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are very pale brownish-cream colour with conspicuous black dots; two close to base; two, almost confluent, close to fold at $\frac{1}{4}$; two placed obliquely above this; three in disc before middle and two in disc beyond middle; a smaller spot below costa at middle; a series of faint sub-terminal marks and a terminal series of blackish dots. The hind-wings are almost white.

The perfect insect appears in November.

Described and figured from a specimen kindly submitted by Mr. Philpott.

Sub-family 2.—TORTRICIDÆ.

Ocelli present. Fore-wings with vein 2 from before $\frac{1}{4}$ of lower margin of cell. Hind-wings without cubital pecten (except *Epalxiphora* and *Ctenopseustis*), vein 5 present. (Plate E., figs. 13-40 and Plate F., figs. 1-9.)

This is the principal sub-family in New Zealand and Australia, but not generally elsewhere. It is distinguished from the *Eucosmides* by the absence of the cubital pecten in hind-wings; but three genera which possess this pecten (*Ctenopseustis* and *Epalxiphora* in New Zealand, and *Sparganoths* in America and subsequently Europe) must notwithstanding be included in the sub-family on a consideration of the sum of their characters, the occurrence of the structure being perhaps due to reversion. In no genus of *Eucosmides* is the pecten absent.

Represented in New Zealand by the following sixteen genera:—

- | | |
|-----------------|--------------------|
| 1. PROSELENA. | 9. CTENOPSEUSTIS. |
| 2. PYRGOTIS. | 10. GELOPHAULA. |
| 3. CATAMACTA. | 11. EPICHORISTA. |
| 4. CAPUA. | 12. HARMOLOGA. |
| 5. EURYTRECTA. | 13. PHILOCRYPTICA. |
| 6. ASCERODES. | 14. ECCLITICA. |
| 7. TORTRIX. | 15. CNEPHASIA. |
| 8. EPALXIPHORA. | 16. OCHETARCHA. |

Genus 1.—PROSELENA, Meyr.

Antennae in male rather strongly ciliated. Palpi moderate, porrected, second joint dilated with rough scales above and beneath, terminal short. Thorax smooth. Fore-wings with vein 7 to termen, 8 separate. Hind-wings with vein 3 from much before angle, remote and nearly equidistant from 2 and 4, 4 from angle, 5 rather approximated to 4 at base, transverse vein extremely oblique, 6 and 7 long stalked. (Plate E., figs. 16, 17 neuration of *Proselena niphostrota*; fig. 18 head of ditto.)

There are two species in New Zealand and one in Australia.

PROSELENA NIPOSTROTA.

(*Prothelymna niphostrota*, Meyr., Trans. N.Z. Inst. xxxix., 117.)

(Plate XXII., fig. 14 ♀.)

This species has occurred at Wellington, Dunedin, Clifden (Wallace), and Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The head and anterior portion of the thorax are white. The fore-wings are elongate, oblong, with the apex and tornus rounded and the termen oblique, white with dull chocolate brown markings consisting of a basal patch covering the entire wing to about $\frac{1}{4}$; a rhomboidal patch on the costa at about $\frac{1}{2}$ and a much smaller square spot at about $\frac{3}{4}$; a number of very irregular transverse bands on the dorsum extending from the basal patch to the tornus and half reaching to the costa; a small elongate-oval patch near the termen below the apex and several minute terminal dots. The hind-wings are pale greyish-brown.

Varies considerably in the extent and intensity of the brown markings which, in some specimens, are more or less tinged with grey.

The perfect insect appears from December till March, and frequents forest or scrub. Although usually very rare, it sometimes occurs plentifully on the blossoms of the common *Veronica* (*V. salicifolia*), which flowers during March and April. It flies freely soon after sunset.

PROSELENA ANTIQUANA.

(*P. antiquana* Walk., Cat., vol. xviii., 307; *maiorana*, ib., 308; *fusiferana*, ib., 355; *spoliata*, ib., 356; *vetustana*, ib., 358; *morosana*, ib., 382; *accensana*, ib., vol. xxx., 983; *Prothelymna nephotana*, Meyr., Trans. N.Z. Inst., xv., 57.)

(Plate XLV., fig. 29 ♂.)

This rather obscure, narrow-winged species has occurred at Wellington, Christchurch and Dunedin. It is evidently a local insect.

The expansion of the wings is about $\frac{1}{4}$ inch. The fore-wings are elongate-oval with the termen oblique; brownish-ochreous dappled with numerous indistinct darker brown markings; there is a cloudy shading on the basal third of the costa and another shading on the apical half; four indistinct transverse lines before the middle; a pale reddish-brown patch in the disc and a series of dusky longitudinal streaks on the terminal area. The hind-wings are very pale whitish-ochreous with the veins very faintly marked in grey.

Varies considerably in the distinctness of the markings.

The perfect insect appears from September till March, and may be looked for amongst scrub, near the sea-coast.

Described and figured from a specimen in Mr. Philpott's collection.

Genus 2.—PYRGOTIS, Meyr.

Antennae in male moderately strongly ciliated. Palpi moderate, sub-ascending, second joint with rough projecting scales beneath and towards apex above, terminal moderate. Thorax with posterior crest. Fore-wings with veins 7 and 8 stalked, 7 to termen. Hind-wings with veins 3-5 separate, equidistant, rather approximated towards base, 6 and 7 short-stalked. (Plate E., figs. 13, 14 neuration of *Pyrgotis pyramidias*; fig. 15 head of ditto.)

We have three species in New Zealand and one species is known from Australia.

PYRGOTIS PYRAMIDIAS.

(*Pyrgotis pyramidias*, Meyr., Trans. Ent. Soc. Lond., 1901, 571.)

(Plate XXIV., fig. 12 ♀.)

This bright-looking little species has occurred on the Tararua Range in the North Island. In the South Island it has been found on the Mount Arthur Tableland, the Humboldt Range, and in the Routeburn Valley, near Lake Wakatipu, as well as at Otatara, near Invercargill.

The expansion of the wings is a little over $\frac{1}{2}$ inch. The fore-wings are rather broad with the apex round-pointed and the termen strongly curved and very oblique; bright orange-yellow to bright orange-brown; there are sometimes a few obscure purplish-brown spots near the middle of the wing and always a very conspicuous triangular white spot placed obliquely on the dorsum at $\frac{1}{3}$, with its longest side towards the termen; a small white mark near the tornus and several very minute white marks on the termen; there are usually four minute blackish or dark brown marks on the costa immediately before the apex; the cilia are orange-brown barred with darker brown. The hind-wings are shining white, sometimes with a few very faint grey spots towards the dorsum; the cilia are white.

There is considerable variation in the depth of the ground colour of the fore-wings as well as in the presence or absence of the faint purplish-brown spots. The white markings are also somewhat variable in number, extent, and intensity.

The perfect insect appears from October till February. It usually frequents beech forests, at elevations of between 1,500 and 3,000 feet above the sea-level, and in certain restricted localities is very common. In the Routeburn Valley it occurs in great profusion amongst clumps of *Polystichum vestitum*.

PYRGOTIS EUDORANA.

(*Pyrgotis eudorana*, Meyr., Trans. N.Z. Inst. xvii., 143.)

(Plate XXII., fig. 31 ♂.)

This handsome species has occurred in the North Island at Taranaki, Lake Horowhenua, Kaitoke and Wellington. It has not been recorded from the South Island at present.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are broad with the costa strongly arched, the apex somewhat acute and projecting, the termen curved and hardly oblique, deep purplish-brown; there are two obscure darker oblique bands, one at about $\frac{1}{3}$ and one at about $\frac{2}{3}$, plainest on the dorsum; a conspicuous pale yellow or reddish-yellow apical patch with the veins and numerous short transverse lines sharply marked in reddish-brown. The hind-wings are bright ochreous-yellow clouded with grey towards the body.

The perfect insect appears in December and February, and frequents forest. It seems to be a very rare insect.

PYRGOTIS CONSENTIENS.

(*Pyrgotis consentiens*, Philp., Trans. N.Z. Inst., xlviii., 421.)

(Plate XLV., fig. 10 ♂.)

This rather lurid-looking little species was discovered by Mr. Philpott on Table Hill, Stewart Island, at an altitude of about 2,000 feet. It has also occurred on Mount Cleugharn, Hunter Mountains, at an elevation of about 3,000 feet.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather broad; dark purplish-grey and very glossy; there are several very irregular patches of deep red scales principally situated on the basal, dorsal and sub-terminal areas; the cilia are deep orange-red. The hind-wings are dark grey, the extreme apical cilia being reddish-ochreous.

The perfect insect appears in December. It is found in alpine scrub consisting of *Veronica* and *Cassinia*.

Described and figured from a specimen in Mr. Philpott's collection.

Genus 3.—CATAMACTA, Meyr.

Antennae in male moderately ciliated. Palpi rather long, prorected, second joint with projecting scales above and beneath, terminal moderate. Thorax without crest. Fore-wings with veins 7 and 8 stalked, 7 to termen. Hind-wings with veins 3 and 4 approximated at base, 5 more or less approximated to 4, 6 and 7 stalked. (Plate E., figs. 22, 23 neuration of *Catamacta gavisana*; fig. 24 head of ditto.)

There are seven species in New Zealand, some of which were formerly referred to the genus *Adoxophyes*, which does not occur in New Zealand. Four of the species are confined to the North Island.

CATAMACTA TRICHROA.

(*Adoxophyes trichroa*, Meyr., Trans. Ent. Soc. Lond. 1901, 578.)

A single specimen of this species was taken by Mr. Meyrick at Whangarei.

The expansion of the wings of the female is about $\frac{1}{2}$ inch. Head, palpi, and thorax dark reddish-fuscous mixed with whitish-ochreous, shoulders with a ferruginous spot. Antennae whitish, ringed with dark fuscous. Abdomen grey. Fore-wings moderate, elongate-oblong, costa anteriorly moderately arched, posteriorly straight, apex somewhat produced, termen sinuate, rather oblique; deep brown-reddish; an irregular shining white streak above middle from base to costa before apex, attenuated towards base, about middle, and at $\frac{1}{2}$; costal area above this streak suffused with ferruginous-ochreous, rest of wing suffusedly mixed with shining white and blackish, apex beneath streak wholly blackish; a shining white suffused subcostal streak on basal $\frac{1}{2}$, and one along fold from base to near tornus, interrupted at $\frac{1}{2}$; cilia deep brown-reddish, mixed with whitish and dark fuscous. Hind-wings grey; cilia whitish, basal third grey.

The perfect insect appears in December.

I am unacquainted with this species. The above is a copy of the original description.

CATAMACTA RUREANA.

(*Catamacta rureana*, Feld., Reis. Nov. pl. cxxxvii., 47; *Adoxophyes camclina*, Meyr., Trans. N.Z. Inst., xxiii., 97.)

(Plate XXVII., fig. 22 ♂, 23 ♀.)

Specimens of this interesting species are at present only recorded from Wellington and from Nelson.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings of the male are rather broad with the costa strongly arched at the base, the apex very slightly pointed and the termen almost straight; pale ochreous with reddish-brown markings, sometimes slightly tinged with purple; the basal area is more or less streaked and spotted with brown; there is a very broad, oblique, irregular central band reaching from $\frac{1}{2}$ to $\frac{3}{4}$ of costa narrowing

and touching the dorsum at about $\frac{1}{4}$; there is a large cream-coloured spot on the costa in the middle of the central band followed by a smaller spot; the terminal area of the wing is usually divided into a number of small squares by brown veins and fine transverse markings. The female has the costa very strongly arched at the base, the apex strongly produced upwards, the termen rounded and almost straight; very rich reddish-purple, darkest near the middle of the wing; there is a very elongate narrow cream-coloured spot on the costa which appears to accentuate the peculiar costal outline. The hind-wings in both sexes are white, faintly tinged with ochreous, with a few very faint grey markings.

In many of the males the brown markings almost cover the whole of the fore-wings. In some female specimens the markings closely resemble those of the male, but are darker, and strongly tinged with purplish-red.

The perfect insect appears from January till March. It frequents restricted localities in forest and is rarely met with.

CATAMACTA LOTINANA.

(*Adoxophyes lotinana*, Meyr., Trans. N.Z. Inst., xv., 40.)

(Plate XLV., fig. 15 ♂.)

This distinctly-marked species has occurred at Christchurch, Dunedin and on Bold Peak, Lake Wakatipu.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are oblong with the apex very acute and the termen rounded; pale ochreous-brown and very glossy; the spaces between the veins and the dorsal margin are more or less clouded with dull reddish-brown and on the terminal third there are rows of five or six dull grey spots between each of the veins, the veins themselves being pale ochreous and very conspicuous. The hind-wings are pale whitish-ochreous very faintly mottled with pale grey. The cilia of all the wings are shining white with a grey basal line. The female has the fore-wings more oblong and the hind-wings paler than the male.

The larva feeds on the toe toe grass (*Arundo conspicua*). The pupa is enclosed in a firm white cocoon attached openly to the surface of the leaves.

The perfect insect appears in December and January.

Described and figured from a specimen in Mr. Fenwick's collection.

CATAMACTA GAVISANA.

(*Catamacta gavisana*, Walk., Cat., xxviii., 312; ? *innotatana*, ib. 333; *Conchylitis marginana*, ib. 371; *Pyrgotis porphyreana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 443; *Capua aristana*, ib. 446; *Adoxophyes conditana*, Meyr., (nec Walk.), Trans. N.Z. Inst., xv., 40.)

(Plate XXII., figs. 15, 16, 17 ♂ varieties; 18, 34, 35 ♀ ditto.)

This extremely variable species is probably common, and generally distributed throughout the country.

The expansion of the wings varies from slightly over $\frac{1}{2}$ inch to slightly over $\frac{3}{4}$ inch. In the male the fore-wings are rather broad, triangular, the costa very slightly bent and the termen oblique; the colour and markings are very variable as described below. The hind-wings are pale grey more or less mottled with darker grey; the cilia are pale grey. The female has the fore-wings rather long, the costa strongly arched towards the base, slightly curved beyond the middle, the apex somewhat produced

and the termen slightly curved and rather oblique; the colour and markings vary as described below. The hind-wings are white, with the apex slightly tinged with ochreous, and the cilia white.

According to Mr. Meyrick this species is distinguishable from *Catamacta lotinana* in the female by the white hind-wings and different form, and in the male by the conspicuous dark basal half of the cilia of the fore-wings, the usually perceptible basal patch and costal spot, and the much smaller size.*

The variability of this species is extraordinary and the difference between the sexes considerable. Some of the principal varieties may be briefly described as follows, intermediate forms being constantly met with:

A. MALES.

1. Fore-wings very pale ochreous-grey, costa margined with brown to about $\frac{1}{2}$; often a rather large brown spot on the costa before the apex; except a pale basal area, the rest of the wing is more or less dappled with light brown (fig. 17.)
2. Fore-wings darker with the markings yellowish-brown and several conspicuous white spots on the costa (fig. 16.)
3. Fore-wings uniform pale brownish-grey, the termen and basal half of the costa edged with very dark blackish-brown.
4. Fore-wings uniform cream colour with the basal half of the costa edged with brown.
5. Fore-wings dark blackish-brown with a large, white, triangular spot on the costa at about $\frac{3}{4}$ and a smaller one before the apex. Hind-wings dark grey. This is a very dark and distinct variety but every gradation occurs between it and the ordinary pale forms (1 and 2) (fig. 15.)

B. FEMALES.

1. The usual type of female has the fore-wings pale straw-colour with the veins marked in brown and a number of fine transverse markings often roughly dividing the wing into a number of squares; there is a rather darker basal area; a broad diffused band from $\frac{1}{4}$ of costa to $\frac{3}{4}$ of dorsum and a large brown patch on the costa, just before the apex, the two markings touching in such a manner as to leave a pale spot between them on the costa (fig. 18.)
2. Another form like No. 1 but without the veins or fine transverse markings in brown (fig. 34.)
3. This form also resembles No. 1 but has the brown markings much brighter and redder (fig. 35.)
4. Fore-wings pale brown, slightly tinged with purplish-grey; no markings except several cream-coloured spots on the costa.

The larva is described by Mr. Meyrick as moderately stout, cylindrical, slightly tapering at both ends; pale greyish-green, spots concolorous; head pale greyish-ochreous, lateral margins dark fuscous, mouth spotted with dark fuscous; second segment greenish-whitish, with an ochreous-tinged dorsal plate; anal segment greenish-whitish, with a small ochreous-tinged plate. It feeds in a light silken

tube, amongst spun-together leaves of *Genista* in garden hedges. The pupa is enclosed in a thin, firm, white, silken cocoon in the same place. Probably the larva is polyphagous, the food-plant not being native.

The perfect insect appears from October till April or May. It usually frequents forest and is fairly common. Mr. Meyrick states that it flies freely over its foodplant for a short time about sunset, and also occurs at light.

CATAMACTA CHRYSOMELA.

(*Catamacta chrysomela*, Meyr., Trans. N.Z. Inst., xlvi., 103.)

(Plate XXVII., fig. 24 ♂.)

This very bright-looking species has occurred at Kaco, north of Auckland.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are very bright, glossy orange-brown with several rows of extremely faint purplish spots in the disc, only visible in a strong light. The hind-wings are grey, tipped with orange-brown at the apex.

The perfect insect appears in January, and is found amongst manuka (*Leptospermum scoparium*).

CATAMACTA TRANSFIXA.

(*Catamacta transfixa*, Meyr., Trans. N.Z. Inst., lv., 203.)

(Plate L., fig. 5 ♂.)

This species was discovered in Gollan's Valley, near Wellington.

The expansion of the wings is five-sixteenths of an inch. The fore-wings are oblong with apex pointed and somewhat produced; pale dull purple with numerous scattered rather large yellowish-brown spots; there are two longitudinal whitish streaks from the cell below the apex and a central longitudinal streak from the base of the wing to the termen, slightly above the middle. The hind-wings are dull ochreous, faintly dappled with grey. The head and thorax are deep reddish-purple.

The perfect insect appears in December, and frequents forest.

CATAMACTA CALLIGYPSA.

(*Catamacta calligypsa*, Meyr., Trans. N.Z. Inst., lvi., 415.)

(Plate LII., fig. 25 ♀.)

This species has occurred at Gollan's Valley and Paekakariki, near Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings have the costa strongly arched at the base and the termen sinuate below apex; snow white with pale bluish blotches, sparsely speckled with black or very dark brown; a large irregular triangular blackish marking on dorsum near base; another much smaller mark on dorsum near middle; a small bluish blotch in disc; a very large, somewhat rectangular, bluish blotch above tornus, extending more than half-way to costa; a small triangular bluish blotch on costa at $\frac{1}{4}$; another at $\frac{3}{4}$, and a further irregular mark before apex; the cilia are blackish-grey. The hind-wings are very pale ochreous-grey dappled with grey, darker in the male.

The perfect insect appears in December and frequents forest.

*The absence of a thoracic crest will be found a very useful character in recognising the various varieties of *Catamacta gavi-sana*, many of which may closely resemble other species in their superficial appearance.

Genus 4.—CAPUA, Steph.

Antennae in male ciliated. Palpi moderate, porrected, second joint with more or less projecting scales above and beneath, terminal short. Thorax usually with slight crest. Fore-wings with veins 7 and 8 stalked, 7 to termen. Hind-wings with veins 3 and 4 connate or seldom stalked, 5 approximated to 4 at base, 6 and 7 stalked. (Plate E., figs. 19, 20 neuration of *Capua semiferana*; fig. 21 head of ditto.)

Widely distributed, but much more numerous in Australia than elsewhere.

We have seven species in New Zealand.

CAPUA CYCLOBATHRA.

(*Epagoge cyclobathra*, Meyr. Trans. N.Z. Inst., xxxix., 113.)

(Plate XXVI., fig. 28 ♂.)

This very distinctly-marked species was discovered at Invercargill by Mr. Philpott. It also occurs at Dunedin.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are rather elongate, oblong, with the apex obtuse and the termen rather oblique, dull purplish-grey with a large, outwardly curved, pale ochreous basal patch containing an obscure transverse streak and an indistinct basal shading. The hind-wings are pale grey.

The perfect insect appears from November till March, and frequents low undergrowth in forest. At present it must be regarded as a rare species.

CAPUA ZYGIANA.

(*Pyrgotis zygiata*, Meyr., Trans. N.Z. Inst., xv., 39.)

A single specimen of this species was captured by Mr. Meyrick at Christchurch about the year 1882. It has not been rediscovered by any other entomologist.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. It is stated to differ from the highly variable *C. plagiata* in the fuscous ground-colour, leaden strigulations, grey hind-wings and small size.

The perfect insect appears in March.

I am unacquainted with this species.

CAPUA PLAGIATANA.

(*Conchylis plagiata*, Walk., Cat., xxviii., 370; *Conchylis recusana*, Walk., ib. 371; *Grapholitha punana*, Feld., Reis. Nov., pl. cxxxvii., 43; *G. xylinana*, ib., 44; *Paedisca lucioplaga*, Walk., Cat., xxviii., 381; *Dichelia lucioplaga*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 470; Trans. N.Z. Inst., xv., 36; *Pyrgotis plagiata*, Meyr., Proc. Linn. Soc. N.S.W. 1881, 441; Trans. N.Z. Inst., xv., 38; *Capua tornota*, Meyr.; ib., xxxix., 114.)

(Plate XXIV., figs. 13, 14, 45 ♂ varieties; 15, 16, 17

♀ ditto; 18, 19 Auckland Island form.)

This very pretty and variable species is common and generally distributed throughout New Zealand. A large and extremely variable form is also very common at Auckland Island.

The expansion of the wings is from $\frac{1}{2}$ to $\frac{3}{4}$ inch. The fore-wings are triangular with the apex acute and the termen rather curved and oblique; creamy-white with bright yellowish-brown or pinkish-brown markings variable in intensity; there is a faint

basal shading; a short dark brown mark on the dorsum; a conspicuous dark band from $\frac{1}{4}$ of costa to $\frac{2}{3}$ of dorsum meeting another band from $\frac{1}{4}$ of costa to $\frac{2}{3}$ of dorsum, the two forming a V-shaped marking and enclosing a more or less triangular whitish area, often very conspicuous; a large oval patch above the tornus; the cilia are the same colour as the dark markings. The hind-wings are white, sometimes tinged with ochreous at the tip, and more or less dappled with grey; the cilia are white.

There is much variation. Some specimens marked as above described are much clouded with yellow, others with pink. Occasionally almost all the markings are absent and the fore-wings are nearly uniform ochreous or yellowish-brown, sometimes clouded with darker brown in the middle. Another variety has the fore-wings very dark yellowish-brown more or less mottled with darker brown, with a few small whitish dots and the typical markings almost invisible. Other forms have the fore-wings creamy-white, shaded with dull brown, or bluish-grey on the termen and dorsum, the V-shaped marking being very obscure. A very striking and fairly common variety of the female has the fore-wings very dark chocolate-brown with a conspicuous semi-circular white mark on the middle of the costa broadly edged with brownish-black. This variety seems to be the insect which was formerly known as *Dichelia lucioplaga* (Fig. 17). Forms more or less intermediate between all these varieties may occasionally be met with. Specimens from Auckland Island are in nearly every case larger, the expansion of the wings often nearly reaching $\frac{3}{4}$ inch; the white markings on the fore-wings are absent, or very much reduced in size; the large V-shaped marking very indistinct or absent; the fore-wings often strongly dappled with blackish or dark brown and the hind-wings usually strongly dappled with grey. In fact the tendency here is evidently towards a darker coloration, or melanism, and this is no doubt due to the very cold, wet, and stormy climate which prevails at the island during most of the year. The larva of *Capua plagiata* is described by Mr. Meyrick as being moderately stout, cylindrical, slightly tapering at each end; pale whitish-grey-greenish, becoming darker smoky grey on the back; the head and plate of the second segment, when young is black, when full-grown greenish-ochreous. It feeds between joined leaves of oak (*Quercus robur*), gnawing numerous holes, and forming a loose silken gallery for shelter. The pupa is enclosed in a thin silken cocoon in the same position. These larvae were found plentiful in April, and a female bred indoors in June. The food-plant, being imported, the larva is probably polyphagous. I have taken the larvae in December, enclosed in twisted leaves of *Aristotelia racemosa*, and this was probably one of its staple foodplants, when the country was in its primitive condition.

The perfect insect appears from September till June, and is fairly common, usually frequenting openings in the forest, or scrub. I have, however, never taken it so commonly on the mainland of New Zealand, as I did amongst ferns (*Polystichum*) in the Auckland Island rata forest, during November, 1907.

CAPUA PLINTHOGLYPTA.

(*Pyrgotis plinthoglypta*, Meyr., Trans. N.Z. Inst., xxiv., 218.)

(Plate XXVI., fig. 4 ♂.)

At present this pretty and very distinctly-marked species has only been taken at Ohakune, Wellington, Invercargill and Stewart Island.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are triangular with the apex pointed and the termen rounded and oblique; bright pinkish-brown with dark yellowish-brown markings; a curved band extends from the base of the wing to the dorsum at about $\frac{1}{3}$; a second curved band from the costa at $\frac{1}{3}$ almost to the tornus; a third, very strongly curved band, leaves the costa slightly beyond $\frac{1}{3}$ and rejoins it just before the apex; there is a small silvery-white mark below the costa at $\frac{1}{2}$, an oblique silvery mark near the apex followed by an oblong, silvery-white spot; a somewhat crescentic silvery mark on the termen below the apex; the cilia are bright pinkish-brown. The hind-wings are very pale whitish ochreous, faintly dappled with grey; the cilia are dull white.

There is slight variation in the extent of the silvery white markings.

The larva, which feeds on rimu (*Dacrydium cupressinum*) is about $\frac{1}{2}$ inch in length; cylindrical, slightly tapering posteriorly; the head is yellowish-brown with two U-shaped dark marks on frons; segment 2 is horny, semi-transparent, showing back portion of head through it; rest of body pale green with segmental divisions marked in paler green; a paler green lateral ridge; a subdorsal row of small warts, each wart emitting a fine bristle, the warts on the thoracic segments slightly larger; anal segment with dark green dorsal plate. The larva is active, living under a silken web amongst the rimu foliage.

The pupa is enclosed in a loose cocoon formed of frass and silk amongst the foliage of the foodplant.

The perfect insect appears from November till February, and may often be beaten from the rimu. So exactly does the resting insect resemble a small withered fragment of the foliage that I have, on several occasions, boxed such a fragment, under the impression that it was a specimen of the moth!

CAPUA ARCUATA.

(*Capua arcuata*, Philp., Trans., N.Z. Inst., xlvii., 198.)

(Plate XLV., fig. 27 ♀.)

This species was discovered by Mr. Philpott at West Plains near Invercargill. It is superficially very like a dull specimen of *C. plinthoglypta* from which, however, it differs considerably in the detailed markings.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are dull pinkish-brown with darker brown and dull whitish markings; there is an irregular dark brown band near the base broader on the dorsum; a very large, irregular median band covering most of the costal region and enclosing a large triangular whitish costal spot; the apical and terminal areas are clouded with dark chocolate-brown and there are small whitish marks on the costa before the apex, on the termen below the apex, before the tornus and on the sub-terminal area. The hind-wings are pale brownish-ochreous irregularly mottled and clouded with pale grey.

The perfect insect appears in January and frequents lowland forests.

Described and figured from the type specimen in Mr. Philpott's collection.

CAPUA SEMIFERANA.

(*Teras semifera*na, Walk., Cat. xxviii., 306; *Sciaphila detritana*, Walk., ib., 356; *Tinea admotella*, ib., 485; *Graphotita abnegatana*, ib. xxx., 991; *constrictana* ib. xxxv., 1785; *Capua semifera*na, Meyr., Proc. Linn. Soc. N.S.W., 1881, 453; Trans. N.Z. Inst., xv., 37; *Capua polias* ? Meyr., ib. xlv., 26.)

(Plate XXVI., figs. 5, 6 ♂ varieties; 7 ♀.)

This little species seems to be common and generally distributed throughout the country.

The expansion of the wings varies from slightly under to slightly over $\frac{1}{2}$ inch. The fore-wings, which are somewhat dilated in the male, vary from pale greyish-ochreous to light reddish-brown; there is a series of minute black marks on the costa and dorsum; an irregular brownish patch near the base, often outwardly margined with black; a more or less distinct central band often obsolete towards the dorsum, brown, usually much darker or blackish on the costa and in some specimens represented by a large elliptical, blackish marking on the costa with a pale grey centre; there is usually a small brown mark near the termen; the cilia are ochreous or pale reddish-ochreous, much paler near the tornus. The hind-wings are grey faintly mottled with darker grey; the cilia are pale grey.

This species is very variable in size, colour and intensity of markings. In some varieties the markings are almost absent.

The perfect insect appears from October till April, and usually frequents open, grassy places, but is also found in the forest and on the coast sand-hills. It often flies freely in the late afternoon sunshine. Mr. Meyrick states that he has taken worn specimens in August, which had probably hibernated.

CAPUA INTRACTANA.

(*Capua intractana*, Walk., Lep. Het. 83 (1869); *C. sordidatana*, Meyr. Proc. Linn. Soc. N.S.W. xxxv., 454; *C. obfuscata*na, Meyr., ib. 455.)

(Plate LI., fig. 24 ♀.)

This very dark-looking little species was first found by Mr. Philpott at Nelson. I have also taken it at Paekakariki. It has apparently been introduced from Australia comparatively recently, and is now quite common at both the localities named.

The expansion of the wings of the male is $\frac{1}{2}$ inch; of the female fully $\frac{1}{2}$ inch. The fore-wings of the female are elongate-oblong, with the termen rounded; dull brown with heavy blackish-brown markings, the whole wing having a somewhat speckled appearance; there is a large basal patch; a broad oblique irregular median band; an elongate triangular patch on costa before apex; a smaller semicircular spot on the termen, and a large rounded tornal blotch. The hind-wings are pale brown, faintly dappled with darker brown. The male has the fore-wings blackish-brown with a large pale blotch on the costa at the base and an indistinct pale sub-terminal marking.

The perfect insect appears in April.

Described and figured from specimens kindly given to me by Mr. Philpott.

Genus 5.—EURYTHECKA, Meyr.

Antennae in male ciliated. Palpi moderate, porrected, second joint with projecting scales above and beneath, terminal short. Thorax without crest. Fore-wings with vein 4 absent, 7 separate, to termen, or absent. Hind-wings with veins 6 and 7 approximated at base. (Plate E., figs. 25, 26 neurulation of *Eurythecta zelaca*; fig. 27 head of ditto.)

Confined to New Zealand, being a local development of *Epichorista*. The first two species have vein 7 of the fore-wings absent, in the rest it is present; the alliance being close in all other respects, and the genus being sufficiently defined as a whole, it is needless to separate the two forms. (Meyrick.)

There are nine New Zealand species.

EURYTHECKA ROBUSTA.

(*Zelotherses robusta*, Butl. Proc. Z.S.L., 1877, 403, Pl. xliii., 17; *Steganoptycha negtigens*, ib., 404, Pl. xliii., 18; *Eurythecta robusta*, Meyr., Trans. N.Z. Inst., xv., 56.)

(Plate XXVI., fig. 23 ♂.)

This very distinctly-marked little species was discovered by Fereday, at Christchurch, over 50 years ago. It has since been taken at Alexandra and on Ben Lomond, Lake Wakatipu, and was re-discovered by Mr. S. Lindsay at Harewood, near the Waimakariri River, Christchurch, in 1925.

The expansion of the wing is about $\frac{3}{4}$ inch. The fore-wings are lanceolate, rather narrow, with the termen very oblique, white, pale grey, ochreous or reddish-ochreous-brown with well-defined dark brown or blackish markings; there is a narrow, oblique band near the base; a moderate oblique band from before the middle of the wing to the dorsum at $\frac{3}{4}$; three small oblique spots on the costa between the central band and the apex; a fourth spot at the apex, and two or three others on the termen. The hind-wings are pale brown.

The perfect insect appears from October till April, and frequents grassy situations.

EURYTHECKA ZELAEA.

(*Eurythecta zelaca*, Meyr., Trans. Ent. Soc. Lond., 1905, 233.)

(Plate XXVI., fig. 10 ♂.)

This interesting little species was discovered by Mr. J. H. Lewis at Ida Valley, Central Otago, and subsequently observed by him near Arrow.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are lanceolate, round pointed, obviously more elongate than in *E. robusta*, dull ochreous speckled with dull brown and white; there is a series of small brown marks on the costa, the spaces between being clouded with white; a dark brown spot before the middle and another on the tornus; the cilia are dull ochreous mixed with brown. The hind-wings and cilia are rather dark brown.

The larva inhabits a pear-shaped case, composed of sand, very much attenuated at its posterior extremity. It

was found by Mr. Lewis on lichen-covered rocks, the larva no doubt feeding on the lichens.

The perfect insect appears in November and December. Mr. Lewis states it is very common amongst rocks, but evidently has a very restricted range.

EURYTHECKA VARIA.

(*Eurythecta varia*, Philp., Trans. N.Z. Inst., xlviii., 421.)

(Plate XLV., fig. 8 ♀.)

This very distinctly-marked little species was discovered by Mr. Fenwick at Kaikoura. It has also occurred at Horseshoe Lake near Christchurch.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are dull white; there are three large black blotches, one near the base, another near the middle and a third just before the tornus; there is a reddish-ochreous patch on the costa from the base to about the middle, speckled with blackish scales; three similar small roundish patches before the apex, a fourth below the apex and a large irregular patch on the termen. The hind-wings are dark blackish-brown. The head and thorax are reddish-ochreous.

The perfect insect appears in December and March and is common in swampy places.

Described and figured from a specimen in the Fenwick collection.

EURYTHECKA TRIMACULATA.

(*Eurythecta trimaculata*, Philp., Trans. N.Z. Inst., xlvii., 198.)

(Plate XXVII., fig. 6 ♂; 7 ♀.)

This very distinctly-marked little insect was discovered by Mr. Philpott near Queenstown, Lake Wakatipu. Mr. S. Lindsay has also found it fairly commonly at Horseshoe Lake, near Christchurch.

The expansion of the wings of the male is $\frac{3}{4}$ inch; of the female seven-sixteenths of an inch. The fore-wings of the male are pale grey, sprinkled with darker grey; there is a broad, oblique, bronzy-brown bar on the dorsum at about $\frac{1}{4}$; a fainter patch on the tornus and several small indistinct marks on the costa and termen. The hind-wings are grey. In the female the fore-wings are rather dark grey thinly speckled with brownish-grey; there is a broken oblique black transverse line near the base; a broad black transverse line at $\frac{1}{4}$; several fine broken markings near the middle of the wing and three short bars on the apical half of the costa; a very broad, triangular black patch on the tornus, its apex nearly touching the costa; another patch below the apex and several small black marks between these. The hind-wings are bronzy-grey, darker near the apex and termen.

The perfect insect appears in November and December, and is found on open country, sometimes from 2,000 to 3,000 feet above the sea-level.

EURYTHECKA POTAMIAS.

(*Eurythecta potamias* Meyr., Trans. N.Z. Inst., xli., 11.)

(Plate XXVI., fig. 11 ♂; 12 ♀.)

This interesting species was discovered by Mr. Philpott at Riverton near Invercargill.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are elongate, narrow, with the apex obtuse and the termen obliquely rounded; vein 3 is absent and vein 7 is present; there is a narrow costal fold towards the base in the male; ochreous-brown or dark brown tinged with ochreous or reddish-brown, the termen being always clouded with reddish-brown; in the male there is always a longitudinal ochreous streak running from the base to the dorsum and thence curved upwards to the costa before the apex; this marking is subject to considerable variation in intensity and often extends along the dorsum for a considerable portion of its length. The hind-wings are dark grey.

The perfect insect appears in March. It occurred abundantly on patches of native grasses growing on the beach, a little above high-water mark.

Described and figured from specimens from Mr. Philpott's collection.

EURYTHECTA PARALOA.

(*Eurythecta paraloxa*, Meyr., Trans. N.Z. Inst., xxxix., 116.)

(Plate XXVI., fig. 13 ♀.)

This very pretty little species was discovered by Mr. Philpott at Riverton near Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather narrow, oblong, with the apex rounded and the termen oblique; vein 7 is present; rich brownish-yellow with pale yellow-ochreous markings; there is a broad, oblique, transverse band from about $\frac{1}{2}$ of the costa to about $\frac{3}{4}$ of dorsum and a broad curved band from the costa at $\frac{1}{2}$ nearly touching the tornus and returning to the apex; the edges of the basal band are marked with blackish-brown; there are four minute black marks on the costa before the apex and one below the apex. The hind-wings are grey with the cilia dull white.

There is considerable variation in the ground colour of the fore-wings, which ranges from yellowish-brown to bright reddish-brown; the small black markings on the costa are also variable and are sometimes represented by a triangular blotch.

The perfect insect appears from November to February, and frequents low vegetation on the sandhills, where it is stated to be very common.

Described and figured from a specimen kindly given to me by Mr. Philpott.

EURYTHECTA LOXIAS.

(*Eurythecta loxias*, Meyr., Trans. N.Z. Inst., xx., 74.)

(Plate XXVI., fig. 22 ♀.)

A few specimens of this large and very clearly-marked species have occurred in the North Island at Waimarino and in the South Island on Mount Arthur at elevations of from 3,000 to 4,000 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are oblong with the termen almost straight; dull greyish white faintly dappled with dull orange; there is an irregular blackish-brown mark near the base; a very conspicuous, oblique, blackish-brown bar from the costa at $\frac{1}{2}$ to the dorsum a little before the tornus, followed by a cloudy purplish-brown shading; a semi-circular brown spot and a dot on the costa before the apex and a wedgeshaped spot near the termen. The hind-wings are dark blackish-brown, darkest near the termen.

The perfect insect appears in January, and is found amongst the rough sub-alpine scrub, which grows on the sides of the limestone valleys on the Tableland of Mount Arthur.

EURYTHECTA EREMANA.

(*Proclana eremana*, Meyr., Trans. N.Z. Inst., xvii., 144.)

This species is evidently very closely allied to *Epichorista siriana* and may, possibly, ultimately prove only a form of that insect. At present it is recorded from Waimarino, Castle Hill (2,500 feet), and Invercargill, but being inconspicuous is probably often overlooked.

It differs from *E. siriana* in the following respects:—

The fore-wings are lighter and more ochreous, there is no discal dot and the cilia of the hind-wings are paler.

The perfect insect appears in December and January. It frequents swampy situations and in certain restricted localities it is quite common.

Described from a specimen received from Mr. Philpott.

EURYTHECTA CURVA.

(*Eurythecta curva*, Philp., Trans. N.Z. Inst., I., 127.)

(Plate XLV., fig. 14 ♂.)

This interesting species was discovered by Mr. Philpott on Mount Cleughearn, Hunter Mountains, at an elevation of about 3,500 feet above the sea-level.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are oblong with the costa strongly arched and the termen very oblique, dull greyish-ochreous; the margins of the discal cell are broadly marked in darker ochreous and the rest of the veins much less distinctly marked. The hind-wings, which have the apex very pointed and downwards-curved, are brownish-grey. The head and palpi are reddish-brown.

The perfect insect appears in January, and is fairly common on low herbage.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

Genus 6.—ASCERODES, Meyr.

Antennae in male biciliated with long fascicles. Palpi moderate, porrected, triangularly scaled with long rough projecting hairs diminishing to apex. Thorax without crest, hairy beneath. Fore-wings with vein 7 separate to termen. Hind-wings with veins 3 and 4 separate, approximated at base, 5 parallel, 6 and 7 closely approximated towards base. (Plate E., figs. 28, 29 neuration of *Ascerodes prochlora*; fig. 30 head of ditto.)

At present contains only the one species.

ASCERODES PROCHLORA.

(*Ascerodes prochlora*, Meyr., Trans. Ent. Soc. Lond., 1905, 234.)

(Plate XXIV., fig. 38 ♂.)

This species has occurred on Mount Olympus near Castle Hill, West Coast Road, on the Humboldt Range and Lake Harris at the head of Lake Wakatipu, at elevations of from 4,600 to 5,000 feet. It has also been taken on The

Hump and Hunter Mountains, as well as on Mount Rakiahua, Stewart Island.

The expansion of the wings varies from $\frac{3}{4}$ to $\frac{7}{8}$ inch. The fore-wings are rather elongate with the costa moderately arched at the base, the apex rounded and the termen oblique; blackish-grey, very densely overlaid with reddish-brown scales, a few scattered patches only of the ground colour remaining visible; the costa and dorsum are more or less shaded with ochreous. The hind-wings are dark grey clouded with black towards the termen; the cilia are dull white.

The perfect insect appears from January to March, and frequents open country on mountains from 2,000 to 5,000 feet above the sea-level. Mr. Philpott states that the specimens from the exposed summit of Rakiahua are much smaller and narrower-winged than those from other localities.

Genus 7.—TORTRIX, L.

Antennae in male ciliated. Palpi moderate or long, porrected, second joint with rough projecting scales above and beneath, terminal short or moderate. Thorax without crest. Fore-wings with vein 7 separate, to termen. Hind-wings with veins 3 and 4 connate, 5 approximated towards base, 6 and 7 closely approximated towards base. (Plate E, figs. 31, 32 neurulation of *Tortrix leucaniana*; fig. 33 head of ditto.)

This extensive genus is largely represented in all regions. The generic synonymy is considerable, but is not given here as not affecting the New Zealand species.

We have no less than twenty-nine New Zealand species, of which seven are confined to the North Island; eight to the South Island; thirteen common to both islands and one confined to the Auckland Islands.

TORTRIX PICTORIANA.

(*Tortrix pictoriana*, Feld. Reis. Nov. pl. cxxxvii., 55; Meyr., Trans. N.Z. Inst., xv., 51.)

(Plate XXIV., figs. 47, 48 varieties.)

This very handsome and distinct species has occurred at Gollan's Valley, near Wellington in the North Island. It appears to be generally distributed throughout the South Island.

The expansion of the wings is slightly over $\frac{7}{8}$ inch. The fore-wings are elongate-oblong, narrow at the base with the costa slightly arched and the apex and termen rounded; pale yellowish-ochreous; the costa is edged with orange-yellow; there is a rather large basal patch of orange-brown on the dorsum; a broad curved oblique band of the same colour from $\frac{1}{2}$ of the costa to about $\frac{3}{4}$ of the dorsum, these two markings leaving between them a large triangular patch of the original ground colour on the middle of the dorsum; there is a large blackish-brown dot near the termen below the apex, several minute reddish sub-marginal dots and a series of blackish dots towards the dorsum. The hind-wings are very pale yellowish-ochreous faintly dappled with brown.

There is considerable variation in the distinctness of the markings as well as in the ground colour, which ranges from very pale whitish-ochreous to reddish-ochreous. The fore-wings are sometimes clouded with smoky grey or greenish-grey near the base.

The perfect insect appears from January till April, and is usually found in beech forests, often at considerable elevations. According to Mr. Meyrick it is an autumnal insect and occurs commonly in those localities where it is found.

TORTRIX PHILOPOANA.

(*Tortrix philopoana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 515; Trans. N.Z. Inst., xv., 52.)

(Plate XLV., fig. 26 ♀.)

This very distinct species was discovered by Mr. Meyrick at Hamilton in 1880. It has not been detected by subsequent observers.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which have the apex rather prominent and the termen oblique, are cream-coloured very faintly tinged with brown; there is a dark brown blotch near the base; an irregular oblique brown band from the middle of the costa to the tornus, where it is much widened and extends some distance along the termen towards the apex; there is also a small brown spot on the costa before the apex. The hind-wings, which have the apex slightly pointed, are pale greyish-ochreous.

The perfect insect was found in January and was abundant amongst long grass on the skirts of the forest. It is allied to the Australian *Tortrix glaphyrana*.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

TORTRIX LEUCANIANA.

(*Conchylis leucaniana*, Walk., Cat. xxviii., 370; *Tortrix leucaniana*, Meyr., Proc. Linn. Soc. N.S. Wales, 1881, 517, Trans. N.Z. Inst., xv., 53; *Gelechia intactella*, Walk., Cat. xxix., 652; *Teras pauculana*, ib. xxxv., 1781.)

(Plate XXVI., fig. 29 ♀.)

This little species is common and generally distributed throughout the country.

The expansion of the wings is about $\frac{5}{8}$ inch. The fore-wings are rather elongate, oblong with the termen oblique; pale ochreous, sometimes a little darker between the veins; there are a few scattered blackish scales, and rather conspicuous discal dot, usually preceded by a short longitudinal cloudy streak. The hind-wings are dull white or very pale ochreous.

There is slight variation in the depth of the ground colour and in the presence or absence of the central longitudinal streak. A rare variety of the female has the fore-wings suffused with bright orange-brown.

The perfect insect appears from September till April or May. It frequents grassy places, where it is often common, and is usually observed flying close to the ground in the evening.

TORTRIX DEMIANA.

(*Tortrix demiana*, Meyr., Trans. N.Z. Inst., xv., 51.)

(Plate XXIV., fig. 37 ♂.)

This species was discovered by Dr. W. H. Gaze near South Rakaia. It has also occurred at Paradise, Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are rather elongate triangular; *pale dull reddish-brown with the veins very faintly marked in lighter brown*; there is an elongate pale greyish discal dot and the basal and discal portions of the wing are slightly clouded with ochreous. The hind-wings are greyish-ochreous.

The perfect insect appears in February and March and frequents open country or scrub. It seems to be a very rare and local species.

TORTRIX INDIGESTANA.

(*Tortrix indigestana*, Meyr., Proc. Linn. Soc. N.S.W. 1881, 520.)

(Plate XXVI., fig. 8.)

This delicate-looking little species has occurred at Whangarei, Waimarino, Mount Ruapehu (4,000 ft.), at Makara Beach near Wellington and at Waitati near Dunedin.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the termen obliquely rounded; *pale grey very densely speckled with darker grey*; there are four more or less distinct discal dots; one near the base, two near the middle and one on the termen. The hind-wings are pale brownish-grey.

The larva feeds on *Pimelca prostrata* in October and November.

The perfect insect appears from October till December. It is found in the neighbourhood of its foodplant, but seems to be confined to very restricted spots.

Described and figured from specimens bred by Mr. R. M. Sunley.

Mr. Meyrick states that this species is common in Australia, where the larva feeds on *Hibbertia linearis*, and very likely also on other plants.

TORTRIX ARGENTOSA.

(*Tortrix argentosa*, Philp., Trans. N.Z. Inst., lv., 209.)

This species was discovered by Mr. Philpott on the Dun Mountain near Nelson, at about 3,000 feet above sea-level.

Like *Tortrix indigestana*, from which it differs in the whiter ground colour and absence of black speckling.

The perfect insect appears in December and flies in the evening amongst low shrubs and herbage.

TORTRIX SUBDOLA.

(*Tortrix subdola*, Philp., Trans. N.Z. Inst., lv., 212.)

This species, which is very similar to *Tortrix indigestana* in general appearance, has occurred on Mount Ruapehu and the Tararua Range at an altitude of about 4,000 feet.

It is chiefly distinguished by the structure of the palpi, which are greyish-white, darker apically, with the second joint thickened with scales, apex truncate, terminal joint very short, hardly projecting.

The perfect insect appears in December and January.

TORTRIX MELANOSPERMA.

(*Tortrix melanosperma*, Meyr., Trans. N.Z. Inst., xlviii., 414.)

(Plate XLVII., fig. 4 ♂.)

This dull-looking insect has occurred on Arthur's Pass at an altitude of about 3,000 feet above the sea-level.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate with the apex rather pointed and the termen oblique; *pale grey and very glossy with scattered black scales tending to form rows*; the costa is clouded with whitish and there is a conspicuous black dot in the disc at $\frac{1}{2}$. The hind-wings are pale grey.

The perfect insect appears in January. It is evidently attached to open mountain country, but apparently very local.

TORTRIX AERODANA.

(*Tortrix aerodana*, Meyr., Proc. Linn. Soc. N.S.W. 1881, 520;

Trans. N.Z. Inst., xv., 53.)

(Plate XLV., fig. 17 ♂.)

This very obscure-looking little species was discovered by Mr. Meyrick at Hamilton in 1880.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are narrow with the termen very oblique, pale greyish-white without distinct markings. The hind-wings are brownish-grey.

There is considerable resemblance between this species and *T. indigestana*. *T. aerodana* is, however, much smaller, the termen of fore-wings *much more oblique*; the edge of the central band is often not traceable in either, but when perceptible it is much more oblique than in *T. indigestana*.

The perfect insect was found in January, frequenting heathy scrub.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

TORTRIX CHARACTANA.

(*Tortrix charactana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 492, Trans. N.Z. Inst., xv., 50.)

(Plate XXIV., figs. 33, 34, 35 varieties; Plate III., fig. 17 larva.)

This very pretty and distinctly-marked species appears to be generally distributed throughout the country.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are *white with black markings*; there is a rather broad, jagged transverse line at the base; *an oblique line from before the middle of the costa, becoming indefinite towards the tornus and emitting a fainter branch which returns to the costa before the apex*; there are four dots on the costa beyond the middle, several minute dots near the middle of the termen and along the dorsum. The hind-wings are white with a few small grey spots.

There appears to be considerable variation. One small male from Invercargill has the fore-wings *very pale brownish-grey* with the markings obscure except a short, thick oblique mark on the costa. Another from Otira has the fore-wings very pale brown with a *deep red kidney-shaped spot on the costa*, the usual dotted markings being indicated in dull reddish-brown. (Fig. 34).

The larva, which feeds between joined leaves of *Caprosma rotundifolia*, in October and January,

is about $\frac{3}{4}$ inch in length, stout, rather flattened and rapidly tapering from a little before the middle, with the segmental divisions deeply excised. The head is pale ochreous with brown markings; the rest of the body rather dark vivid green with a very bright crimson dorsal streak; the segmental divisions are marked in yellow; there are a few indistinct shining warts emitting short bristles. It is rather a striking larva for a Tortrix and much less active than usual.

The pupa is enclosed in a silken cocoon between joined leaves of the *Coprosma*.

The perfect insect appears from September till January, and again in April or May, there being clearly two distinct broods in the year. I have noticed that the black and white form, treated here as the type, frequents beech forests on mountains at elevations of about 3,000 feet. Mr. Meyrick records the capture of nine specimens near Christchurch, but in my experience the insect is a rare one. This species might perhaps be mistaken for a small and very pale variety of *Ctenopseustis obliquana*, but on closer examination it will be found that it has no real affinity with that insect.

TORTRIX ORTHROPIS.

(*Tortrix orthropis*, Meyr., Trans. Ent. Soc. Lond., 1901, 573.)

(Plate XXIV, figs. 11, 31, 32 varieties.)

This brightly-coloured and variable species has occurred at Ohakune, Wellington, Nelson, Dunedin, Wyndham and Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the costa strongly arched, the termen indented below the apex and rounded beneath; *pale brownish-ochreous to bright reddish-brown*; there is a darker basal area; two very dark reddish-brown elongate spots on the costa, one at $\frac{1}{4}$ and the other just before the apex, the space between these spots being more or less clouded with the darker colour, *the whole thus forming a large and conspicuous costal patch*; there is also a much less distinct shaded patch near the tornus. The hind-wings are very pale brownish-ochreous spotted with grey.

In addition to the variation above indicated, the lighter portions of the fore-wings are often faintly mottled with reddish-brown, and there are frequently two small black spots close to the termen near the middle, and several similar dots above the tornus. Specimens from the southern portions of the South Island have all the wings strongly clouded with dark brownish-grey, and but for the fact that the markings in both the northern and southern forms are identical, each would most certainly be ranked as constituting a distinct species (fig. 11.)

The perfect insect appears in December and January. It seems to chiefly frequent scrubby forest, composed mainly of *Fuchsia*, where the males are sometimes fairly common. The female has not yet been discovered.

TORTRIX POSTVITTANA.

(*Tortrix postvittana*, Walk., Cat. xxviii., 297; Meyr. Proc. Linn. Soc. N.S.W., 1881, 502; *retractana*, Walk., Cat. xxviii., 288; *scitula*, ib. 298; *basilabana* ib. 299; *secretana*, ib. 300; *consociana*, ib. 311; *reversana*, ib. 321; *foedana*, ib. 321; *vicariana*, Walk., Char. Het. 82.)

(Plate XXIV, fig. 36 ♂.)

This very common Australian species was first detected in New Zealand in 1891 and since that time has frequently occurred in the neighbourhood of Wellington. Mr. Clarke reports that it is very common in the Auckland Domain. It is also abundant around the Manawatu River near Ashhurst, and at Nelson.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the costa very strongly arched; there is an *ochreous-brown basal area* extending to $\frac{1}{2}$ of the costa and to $\frac{1}{2}$ of the dorsum; *the rest of the wing is bright reddish-brown, the boundary between the two areas being slightly wavy and very oblique*; there are a few small brown marks on the basal area and sometimes a small ochreous patch on the terminal area near the tornus. The hind-wings are pale ochreous with a faint grey mottling.

The larva feeds on *Pelargonium*. It joins two leaves together and lives between them, changing into a pupa in the same situation.

The perfect insect appears from October till March. It is often observed on windows and seems to frequent gardens and other cultivated localities. Specimens are occasionally met with in the middle of winter.

Mr. Meyrick states that this species is extremely abundant in Australia, where its larva feeds on a great many different plants and it has no doubt been introduced from that country to New Zealand through civilization.

TORTRIX TOROGRAMMA.

(*Caeoccia torogramma*, Meyr., Trans. Ent. Soc., Lond., 1897, 388.)

(Plate XXVI, fig. 27 ♂.)

This very distinct and remarkable-looking species has occurred at Kaeo, Auckland and Wellington in the North Island, to which it appears to be confined.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are *pale purplish-grey with brown and white markings*; there are two oblique brownish transverse lines from about $\frac{1}{3}$ of the costa to about $\frac{2}{3}$ of the dorsum; *two similar lines close together enclosing an elongate wedge-shaped white patch from $\frac{1}{3}$ of the costa nearly reaching to the tornus*; there are one or two brown dots near the apex and a more or less distinct discal dot; the cilia are brown. The hind-wings are pale brownish-grey.

Specimens from the northern parts of the North Island are apparently darker in colour than those from the neighbourhood of Wellington.

The perfect insect appears in September and October, and again in February and March, there being evidently two distinct broods in a season. It frequents dense forests and is especially attached to the silver tree-fern (*Cyathea dealbata*), its general colouring being highly protective

whilst resting on the underside of the fronds. In this respect it closely resembles *Selidosema aristarcha*, both species having evidently acquired a similar wing pattern for the same protective purpose.

TORTRIX ORTHOCOPIA.

(*Tortrix orthocopa*, Meyr., Trans. N.Z. Inst., lv., 661.)

(Plate XXIV., fig. 1 ♂.)

This very distinctly-marked species has occurred at Kaero, north of Auckland, Swanson, Waimarino, and Wellington, but appears to be very rare.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are light brown, sometimes slightly tinged with purplish-grey on the costa and termen; there is an oblique basal patch; a very broad, oblique, central band extending from a little before the middle of the costa to the tornus and a V-shaped mark on the costa before the apex; all these markings are narrowly edged with dark brown and clouded with purplish-grey. The hind-wings are very pale brownish-ochreous with a few very obscure greyish spots.

The perfect insect appears from January till March, and frequents forest.

TORTRIX TIGRIS.

(*Tortrix tigris*, Philp., Trans. N.Z. Inst., xlv., 120.)

(Plate XLV., fig. 19 ♀.)

This rather striking species was discovered by Mr. Philpott at Tisbury near Invercargill. It has also occurred at Kaero, north of Auckland, Swanson, Wellington, and on Stewart Island.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are pale ochreous-brown traversed by three broad, very oblique, wavy brown transverse lines; the first covers the whole of the basal area and extends beyond $\frac{1}{2}$ on the dorsum; between this and the second band there is a double fine, wavy transverse line; the second band covers the whole of the median area and has a large patch of pale ochreous-brown in the middle; between the middle and the apical bands there is a fine, wavy transverse line; the apical band is elongate-triangular, its base resting on the costa immediately before the tip of the wing and its apex touching the termen above the tornus. The hind-wings are pale ochreous spotted with pale grey.

Although somewhat resembling *Tortrix torogramma* and *T. orthocopa* this species is quite distinct from either. It is larger and paler and the fine wavy transverse lines, between the broad bands, are not present in either of those species.

The perfect insect appears in January, and frequents tree-ferns (*Dicksonia*). It is a very rare species.

TORTRIX CONDITANA.

(*Tortrix conditana*, Walk., Cat. xxviii., 306; *Cucoccia cnoptana*, Meyr., Trans. N.Z. Inst., xv., 49; *Cucoccia astrologana*, Meyr., Trans. N.Z. Inst., xxi., 156.)

(Plate XXIV., figs. 42-44 varieties.)

This species has occurred at Ohakune, Wellington, Otira Gorge, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is slightly under 1 inch. The fore-wings have the costa moderately arched, the apex acute and the termen strongly rounded, bright ochreous with reddish-brown markings; there is usually a large, irregular, oval spot touching the costa a little before the middle and a broad triangular mark on the costa beyond the middle with a narrow stripe of the ground colour between them; there are usually two rather large dots on the disc near the termen, an irregular row of sub-terminal dots and frequently a few scattered dots on the other portions of the wing. The hind-wings are white with a few faint grey spots and a series of black terminal dots on the basal portion of the cilia.

There is considerable variation; the large reddish-brown costal spots are sometimes absent, their place being taken by an obscure, short, reddish-brown longitudinal line near the middle of the wing, the wing itself being often thickly studded with black dots; other forms have the fore-wings strongly clouded with bright brownish-ochreous throughout and the reddish-brown markings very faintly indicated.

The perfect insect appears from October till March, and is occasionally taken in the middle of winter. It usually frequents gardens and other cultivated places, and sometimes enters houses, but is never plentiful.

TORTRIX SPATIOSA.

(*Tortrix spatiosa*, Philp., Trans. N.Z. Inst., liv., 150.)

(Plate XLIX., fig. 5 ♀.)

This species has occurred at Ohakune in the North Island and on the Dun Mountain near Nelson, in the South Island.

The expansion of the wings is almost $1\frac{1}{2}$ inches. The fore-wings have the costa strongly arched, the apex acute and the termen strongly bent outwards before the tornus; pale brownish-ochreous, covered with fine darker strigulae; a broad oblique, slightly waved, paler dark edged transverse band from about $\frac{1}{2}$ of costa to middle of dorsum and a very conspicuous deep brown triangular mark on costa before apex. The hind-wings are cream coloured tinged with yellow near the apex, where the cilia are brown. In the single male specimen in my collection the fore-wings are strongly suffused with dark brown.

The perfect insect appears in January, and is found in forest.

TORTRIX SYNTONA.

(*Cucoccia syntona*, Meyr., Subantarctic Islands of N.Z., i., 73.)

(Plate XXIV., fig. 46 ♀.)

This interesting species was discovered at Auckland Island, during the scientific expedition of November, 1907.

The expansion of the wings is about 1 inch. The fore-wings are elongate with the apex somewhat produced and the termen obliquely rounded; ochreous with brown markings; there is a moderately broad, straight longitudinal streak from the apex, almost reaching the base; a few indistinct marks on the termen and two more or less distinct dots in the disc before the middle. The hind-wings are whitish-ochreous with an obscure grey streak along the posterior part of the median fold and another streak beneath vein 2.

There is probably considerable variation in the brown markings on the fore-wings, but further material is needed to determine the extent of this.

Two specimens were bred from larvae inadvertently taken by Mr. J. S. Tennant, feeding in flower heads of *Pleurophyllum speciosum*, at Port Ross on 28th November, 1907. They were afterwards taken to New Zealand with the botanical specimens. The pupa was noted on 10th January following and the perfect insects emerged on the 14th February.

TORTRIX ALOPECANA.

(*Cacoecia alopecana*, Meyr., Trans. N.Z. Inst., xvii., 147.)

(Plate XLV., fig. 11 ♀.)

This brightly-coloured species was discovered by Mr. Meyrick at the Bealey River in 1883. It has not been detected by subsequent collectors.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate-oblong with the costa arched and the tornus rounded; very bright reddish-brown, faintly clouded with purplish towards the base and termen; there are obscure orange-brown patches on the costa near the middle, in the disc, and on the dorsum; the terminal area is spotted with reddish-brown. The hind-wings are pale ochreous, dappled with pale grey and with the apex tipped with reddish-brown.

Of this species Mr. Meyrick remarks as follows:

"I am compelled to separate this species from *T. excessana* on account of the structural difference in the antennae of the male; otherwise I should certainly have regarded it as a mere variety. It is constantly much smaller than the average of that species, but *T. excessana* is occasionally quite as small; it is also much redder, and the hind-wings are more clearly whitish, but these points are quite indefinable, and would not be sufficient for demarcation; moreover, I conceive that the diminished size and the reddish colouring of both larva and imago are the direct effect of the peculiar foodplant. But the antennae of the male are in *T. excessana* tolerably filiform, the joints hardly dilated, the ciliations not longer than the width of the joints; whilst in *T. alopecana* they are conspicuously serrate, the joints almost triangular, and the ciliations much longer, fully twice the greatest width of the joints. These differences are quite constant, and must be regarded as sufficient.

"The larva is 16-legged, moderately cylindrical, somewhat tapering at both ends; variable, yellowish to ochreous-brown; segmental incisions and sometimes sides ochreous-carmine; spots large, pale, in some lights whitish; head and second segment ochreous-brown. Feeds in spun shoots and between joined leaves of *Phyllocladus alpinus* (*Coniferae*), in January. Pupa in the same position.

"I took two specimens in the forests on the Bealey River (2,100 feet) in January, and at the same time found larvae feeding, from which I bred three more specimens in February."

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

TORTRIX EXCESSANA.

(*Teras excessana*, Walk., Cat., xxviii., 303; *Cacoecia excessana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 491; Trans. N.Z. Inst., xv., 48; *Teras biguttana*, Walk., Cat., xxviii., 305; ? *abjectana*, ib., xxxv. 1781.)

(Plate XXIV., figs. 5 and 30 ♂ varieties; 6, 27, 28, 29, ♀ ditto; Frontispiece, fig. 27 portion of egg-mass.)

This species is very common and generally distributed throughout the country and is one of the most abundant and conspicuous species of the New Zealand Tortricides. It is also found on the Chatham Islands.

The expansion of the wings varies from $\frac{3}{4}$ inch to 1 $\frac{1}{4}$ inches. The fore-wings of the male are rather broad, the costa strongly arched and the termen distinctly bowed outward and not oblique; dull reddish-brown to bright reddish-brown generally with very obscure blackish markings; there is a very faintly marked basal patch, an indistinct, irregular central band; an indefinite patch below the apex and an obscure discal spot; the outer portions of the wing are often thickly speckled with blackish grey. The hind-wings are pale grey, sometimes slightly tinged with reddish-brown and faintly dappled with darker grey. The female has the fore-wings longer and narrower and the general colouring usually brighter than the male.

This species is very variable, especially in the female. The principal varieties are enumerated below:—

A. MALES:

- (1.) Fore-wings with rather large white, or pale yellowish, central spot. This form was described by Walker as *Teras biguttana* but it is not a distinct species (fig. 5.)
- (2.) Fore-wings ochreous, marbled with dark brown (fig. 30.)
- (3.) Fore-wings clouded with dark purplish-brown.

B. FEMALES:

- (1.) Fore-wings uniform bright orange-brown without distinct markings (fig. 29.)
- (2.) Fore-wings uniform bright orange-brown densely speckled with dark brown, with faint discal dot and two clear black dots below apex.
- (3.) Fore-wings warm brown with black discal and sub-apical spots (fig. 27.)
- (4.) Fore-wings warm brown thickly speckled with black, except on space between central band and apical patch (fig. 28.)
- (5.) Fore-wings ochreous, marbled with dark brown. This is a very distinct form and identical with variety No. 2 of the male.
- (6.) Fore-wings ochreous-brown with the basal patch and central band well-defined, also a cloudy patch below the apex. This form is often finely dotted with black in addition.
- (7.) Fore-wings more or less clouded with dark purplish-brown.
- (8.) Fore-wings ochreous, with dorsum clouded with brown (fig. 6.)

All these varieties are closely connected by numerous intermediate forms.

The eggs are flat with a semi-transparent border; pale green covered with minute hexagonal depressions. They are deposited partly overlapping one another, the whole forming a flat oval mass.

The larva is polyphagous and has been found feeding on the following plants: *Suttonia australis*, *Aristotelia racemosa*, *Nothopanax arboreum*, *Myoporum laetum* (Ngaio), *Leptospermum scoparium* (Manuka), and *Muhlenbeckia*. It also attacks apples and is often rather destructive in orchards, joining the leaves of the tree to the fruit by means of silken threads and eating the surface of the apples. It does not, however, live inside the apple like its introduced congener *Laspeyresia pomonella*. In addition the larva feeds on honeysuckle and many other introduced plants.

The length of the full-grown larva is about 1 inch, rather slender, tapering towards the posterior extremity, pale green with darker green dorsal line and yellow segmental divisions; there are a few scattered whitish hairs; the head is yellowish, darker coloured on the sides. It feeds between two leaves joined together or, where more convenient, within a single curled leaf. The pupa is freely enclosed in the same situation.

The perfect insect may be found throughout the entire year, but is most abundant during the summer months. It is very common in gardens and other cultivated places and frequently enters houses.

TORTRIX FLAVESCENS.

(*Teras flavescens*, Butl., Proc. Zool. Soc. Lond., 1877, 402;
Cacoccia acrocampa, Meyr., Trans. N.Z. Inst., xxxix., 116.)
(Plate XXV., fig. 1 ♂; 2 ♀.)

This species has occurred at Auckland, Wellington, Christchurch, Otira, Dunedin, and Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the apex obtuse and the termen rounded and slightly oblique; rather dull yellowish-ochreous; the basal area to $\frac{1}{2}$ is more or less clouded with brown and the costal edge is rusty red; there is often a number of blackish-grey spots near the termen and dorsum; below the apex the cilia are rusty red tipped with grey, the rest of the cilia being entirely yellow. The hind-wings are pale ochreous with faint grey spots. The female has rather more elongate wings than the male, is pale yellow with a series of rusty-brown spots on the costa and one spot on the termen below the apex.

Mr. Philpott informs me that the perfect insect appears from the middle of October until the end of January. It always frequents forest and is a common species in the neighbourhood of Invercargill.

TORTRIX FASTIGATA.

(*Tortrix fastigata*, Philp., Trans. N.Z. Inst., xlviii., 422.)
(Plate XLIV., fig. 26 ♂; 27 ♀.)

This species, which is very closely allied to *T. flavescens*, was discovered by Mr. Philpott on Longwood Range at an elevation of 3,000 feet above the sea-level. It has also occurred on the Hunter Mountains at 3,500 feet.

The expansion of the wings is about 1 inch. The male is very similar to the same sex in *T. flavescens*, but differs in having longer and narrower wings. In the female the fore-wings have an obscure basal striga with a blunt projection outwardly

at the middle and the triangular costal patch is connected with the curved median mark beneath it."

The perfect insect appears in December and January, and is found on open mountainous country between 3,000 and 4,000 feet above the sea-level. Mr. Philpott states that *Tortrix fastigata* is probably attached to open country and *T. flavescens* to forest.

Described and figured from specimens in Mr. Philpott's collection.

TORTRIX FERVIDA.

(*Cacoccia fervida*, Meyr., Trans. Ent. Soc. London, 1901, 572.)
(Plate XXVI., fig. 1 ♂, 2 ♀.)

This richly-coloured little species has occurred at Kai-toke near Wellington, Otira Gorge and at West Plains, near Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rich pinkish-brown often slightly tinged with purple; there is a rather indistinct basal patch of crimson-brown; a curved, irregular band of very dark crimson brown near the middle of the wing often divided into several branches before the dorsum; another similar band from about $\frac{1}{2}$ of the costa to the tornus; a small triangular mark of the same colour at the apex; the edges of all these bands are strongly sprinkled with golden yellow scales. The hind-wings are dark grey, darker near the termen. The female has the fore-wings slightly longer and narrower than the male and all the transverse bands are indistinct, except the one reaching from the costa to the tornus.

Some of the males have the spaces between the bands considerably paler in colour.

The perfect insect appears in November and frequents forest. It is not a common species.

TORTRIX SPHENIAS.

(*Cacoccia sphenias*, Meyr., Trans. N.Z. Inst., xli., 11.)
(Plate XLV., fig. 28 ♂.)

This bright-looking species has occurred at Dunedin and Invercargill.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are pale straw-colour much speckled and clouded with reddish-brown; there is a narrow basal area, a very broad, irregular median band, clouded with reddish-brown, and a very deep, distinct wavy reddish-brown band from the costa before the apex to the termen below the middle. The hind-wings are rather dark grey.

This species is evidently very closely allied to *T. fervida*, from which it is stated to differ in the longer ciliae of the antennae of the male and the more oblique termen of the fore-wings.

The perfect insect appears in December and January.

Described and figured from a specimen kindly given to me by Mr. Clarke.

TORTRIX MOLYBDITIS.

(*Tortrix molybditis*, Meyr., Trans. N.Z. Inst., xxxix., 116.)
(Plate XXVI., fig. 3 ♂; Plate III., fig. 4 larva in case; fig. 5 ditto withdrawn from case.)

This interesting little species has occurred at Kaeo, north of Auckland, Waimarino, Wellington, Invercargill and Stewart Island.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings have the costa rather strongly arched, the termen straight and slightly oblique; *very deep purplish-grey with glossy black markings*; there are several minute marks near the base; a narrow angulated transverse line from $\frac{1}{4}$ of the costa almost reaching to the dorsum; an irregular patch on the costa near the middle emitting a wavy line towards the dorsum; this is followed by a broken narrow curved line from the costa at $\frac{3}{4}$ to the tornus; there is another broader bent line near the apex and several minute spots at the apex; a row of black dots is placed on the dorsum and the edges of most of the black markings are more or less sprinkled with golden yellow scales. The hind-wings are dark brown clouded with black towards the termen. The female has the wings slightly narrower than the male.

This insect has some superficial resemblance to *Ecclitica hemichlita*, but may be easily distinguished by its smaller size and short antennal ciliations.

The habits of the larva are very remarkable and quite unlike those of most of the family. It feeds on moss and constructs an elongate cylindrical case of fragments of moss joined together with silk. The length of the case of the mature larva is about $\frac{3}{4}$ inch. It is quite distinct from the much smaller elliptical or oval moss cases constructed by larvae of the genus *Mallobathra*, but closely resembles in shape a miniature case of *Oeceticus omnivorus*. The length of the enclosed larva is about $\frac{1}{2}$ inch. It is rather elongate, cylindrical, with the segments moderately-deeply excised; the head and dorsal plate of the first segment are jet black, horny and very highly polished; the rest of the body is rather pale green, darker towards the middle, with several rows of large rather obscure paler green warts, each of which emits a short bristle; additional bristles are also present on the head, second and last segments. This larva feeds during the winter and early spring on the dripping moss growing on rock faces, or on tree trunks, in the depths of the forest. The case is sometimes held erect, whilst at other times it is simply dragged through the moss. It is extremely inconspicuous, and affords a most efficient refuge for the larva. Whilst walking, the larva projects its head and four or five segments from the case, but darts backwards with lightning rapidity on the approach of danger. These cases are very difficult to find by searching, but are best obtained by shaking the pendant moss into an umbrella. They are, however, rare and none are found containing larvae after the middle of November. By the end of October, or a little later, the larva is full-grown. The case is then shortened to about one-half of its former length, and both the apertures are closed up, the inmate having previously attached one of the ends to a piece of moss.

The perfect insect appears at the end of November or beginning of December, and frequents forest. Owing to its small size and inconspicuous appearance it is very seldom observed on the wing and specimens are thus best obtained in the larval condition. It flies with considerable activity in hot sunshine.

TORTRIX ANTICHRŒA.

(*Tortrix antichrœa*, Meyr., Trans. N.Z. Inst., II., 351.)

(Plate XLVII., fig. 1 ♂.)

This very striking species has occurred on Mount Egmont at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The thorax and basal area of the fore-wings are bright ochreous, the ochreous colouring extending to about $\frac{1}{4}$ on the costa and $\frac{1}{2}$ on the dorsum; the rest of the fore-wings is dark greyish-brown heavily dappled with bright reddish-brown especially towards the disc; the cilia are bright reddish-brown. The hind-wings are dull brown, darker towards the termen; the cilia are also brown. The head and abdomen are dull brown.

The perfect insect appears in February, and frequents sub-alpine scrub.

TORTRIX ZESTODES.

(*Tortrix zestodes*, Meyr., Trans. N.Z. Inst., IV., 203.)

(Plate L., fig. 20 ♀.)

This brightly-coloured species was discovered by Stella Hudson at Flora camp, near Mount Arthur, at an elevation of 2,700 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are oblong with the costa moderately arched at the base and the termen almost straight; *very deep rich reddish-brown*; the basal area is irregularly clouded with ochreous-yellow; there is a broad, very oblique transverse band of bright ochreous-yellow from $\frac{1}{4}$ of costa to beyond $\frac{1}{2}$ of dorsum and another patch of the same colour placed obliquely on the costa beyond the middle; the cilia are deep brown with bright yellow tips below the apex. The hind-wings and cilia are dark brown.

The perfect insect appears in January, and may be looked for amongst sub-alpine scrub.

TORTRIX SCRUPOSA.

(*Tortrix scruposa*, Philp., Trans. N.Z. Inst., IV., 212.)

(Plate L., fig. 4 ♂.)

This pretty species was discovered by Mr. C. C. Fenwick at Whakapapa on the lower slopes of Mount Ruapehu, at an altitude of about 4,000 feet above the sea-level.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the termen rather oblique; *white*, very slightly tinged with bluish, with numerous blackish markings and with scattered grey scales on the discal and apical areas; there are two curved transverse rows of spots on the basal area with the discal spot in each much larger; a curved row of much smaller spots beyond this; a large, very oblique, irregular blotch from near middle of costa to near tornus; a somewhat rectangular tornal blotch almost joining this; five oblique costal stripes between middle and apex, the third and fourth uniting and running to termen just before tornus. The hind-wings, which have the apex considerably produced, are very pale grey. The cilia of all the wings are grey.

The perfect insect appears in January, and may be looked for amongst sub-alpine scrub.

TORTRIX INUSITATA.

(*Tortrix inusitata*, Philp., Trans. N.Z. Inst., II., 225.)

(Plate XLVIII., fig. 28 ♀.)

This species was discovered by Mr. C. E. Clarke at Waitati near Dunedin.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are deep slaty-brown, faintly dappled with darker; there are several short bars of rich chocolate-brown on the costa and an elongate wedge-shaped ochreous patch placed longitudinally on the costa at the base. The hind-wings are brownish-cream colour with numerous broad faint purplish-grey bars between the veins.

The perfect insect appears in October and November, and frequents forest.

Described and figured from a specimen kindly lent to me by Mr. Clarke.

Genus 8.—EPALXIPHORA, Meyr.

Antennae in male ciliated. Palpi moderate, subascending, second joint with dense tolerably appressed scales somewhat expanded towards apex, terminal moderate. Thorax with large, erect crest on each side of back, and small double posterior crest. Fore-wings with veins 7 and 8 stalked,* 7 to termen. Hind-wings with cubital pecten, veins 3 and 4 separate, 3, 4, and 5 more or less closely approximated towards base, 6 and 7 stalked. (Plate E, figs. 37, 38, 39 neurulation of *Epalxiphora axenana*; fig. 40 head of ditto.)

The single peculiar species, which constitutes this genus, is very variable but can be recognised from all others by the triple thoracic crest.

EPALXIPHORA AXENANA.

(*Epalxiphora axenana*, Meyr., Proc. Linn. Soc. N.S. Wales, 1881, 648; Trans. N.Z. Inst., xv., 58; xvii., 147.)

(Plate XXV., figs. 44, 45 ♂ varieties; figs. 46-53 ♀ ditto.)

This very pretty and variable species seems to be generally distributed throughout the North Island.

The expansion of the wings of the male varies from slightly over $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches; of the female from slightly under 1 inch to $1\frac{1}{2}$ inches. The fore-wings in the male have the apex slightly hooked and the termen strongly bowed; the general colour varies from pale ochreous-brown to dull purplish-grey; the costa is broadly shaded with dark brown, darkest near the middle and usually enclosing an oval paler patch; in the purplish varieties there is often a large reddish patch just below the costa; there is nearly always a narrow pale brown or yellowish patch on the apex and usually a number of dark brownish marks on the dorsum. The hind-wings are pale grey obscurely mottled with darker grey.

Many of the males having the ochreous apical patch bear a striking resemblance, in miniature, to the well-known European Buff-tip moth (*Phalera bucephala*). In both these species the wings are closely folded down the body in repose, giving the creature a very stick-like appearance. The resemblance between these two insects, so widely separated in affinities and habitat, is a most interesting case of parallel adaptation to environment.

The female has the fore-wings considerably longer and narrower, the costa肘ed at $\frac{1}{2}$, the apex more strongly hooked, and the colouring and markings much more variable than in the male; the usual ground colour is pale brownish-ochreous or bone colour; there is a dark brown oblong mark on the costa at one-sixth almost meeting a pale brown wavy band on the dorsum at about $\frac{1}{2}$; a narrow pale brown band on the costa at $\frac{1}{2}$ almost meets a large patch of the same colour on the dorsum which

reaches to the tornus; there is a narrow, irregular, edging of brown on the costa from about $\frac{1}{2}$ nearly to the apex, leaving a narrow, oblique apical band of the pale ground colour; the termen is more or less distinctly bordered with pale brown. The hind-wings are very pale ochreous, faintly mottled with grey.

Some of the principal varieties of the female may be briefly described as follows:—

(1.) Fore-wings very pale ochreous with all markings very indistinct. (This form is close to ab. *obsoleta* of Quail.)

(2.) Fore-wings pale bone colour with few distinct markings on central portions (fig. 48.) (Probably ab. *albo-suffusa* of Quail.)

(3.) Fore-wings much clouded with very pale dull green.

(4.) Fore-wings with all markings of varying shades of dark brown in place of pale brown (fig. 47.)

(5.) Fore-wings with anterior and central portions clouded with grey and warm brown patches on the dorsum (fig. 49.)

(6.) Fore-wings with a strong diagonal dark-brown line from apex to middle of base of wing (fig. 46.)

(7.) Fore-wings clouded with bright reddish-brown with broad, longitudinal stripe from apex to middle of base of wing (fig. 50). This form is apparently close to ab. *brunnei-lineata*, Quail.

(8.) Fore-wings entirely dark purplish-brown, except on the costa near the base and on dorsum before the tornus (fig. 53). Probably ab. *nigro-extrema*, Quail.

(9.) Fore-wings with costal area cream-colour and dorsal area rich reddish-brown (fig. 51). A rare and striking form. This may be a form of ab. *purpurascens* of Quail.

(10.) Fore-wings with costal area, except apex, pale brownish-ochreous with pale brown markings; terminal and dorsal areas and thorax almost black (fig. 52). This is another rare and striking variety and also seems to be ab. *purpurascens*, Quail.

According to the late Mr. Quail the female deposits a circular, semi-transparent mass consisting of about 29 eggs. Each egg is oval in outline, slightly convex above, and covered with a rather large crystalline pattern composed mostly of pentagonal but some hexagonal figures. The principal foodplants are Kawakawa (*Macropiper excelsum*) and Kohekohe (*Dysoxylum spectabile*). The newly-hatched larva does not eat the egg-shell. Young larvae feed on the under-surface of a leaf beneath a few threads of silk; later two leaves are drawn together, or, failing this, the leaf is folded over. *Piper excelsum* is the staple pabulum of *Epalx. axenana*: the leaves are broad and succulent. In normal seasons it is difficult to find leaves of *P. excelsum* which are not riddled with holes: one suspects these are made by slugs. The larvae of *Epalx. axenana* are easily alarmed and drop to the ground; they are seldom found feeding between the leaves which have holes in them: the slugs or whatever cause the holes are probably responsible for a high mortality among them by alarming them away from their food.

The adult larva is semi-transparent green, with no appreciable markings except on the head, which is yellowish with characteristic brown mottling on each lobe. The duration of the larval existence is from 30 to 32 days. The skin has a reticulation. From the centre of each figure—hexagonal or what not—of which it is composed a small boss rises tipped with a spike: these spicules persist throughout the larval existence, and practically cover the whole skin; but around the base of setae a space exists with-

*In the specimen figured veins 7 and 8 were stalked in one fore-wing and separate in the other.

out the spicules. The pupal shroud is made by the larva first with an outer series of silk threads apparently placed irregularly, but designed to hold together the two leaves, or the fold of the leaf, and prevent any alteration in the curvature, which might subsequently affect the pupa disadvantageously. Within this outer series of threads a definite, closely woven, elongate cocoon is made, having a slender neck which extends to the edge of leaf or leaves. The pupa is suspended horizontally within the body of the cocoon. In emergence the pupa projects rather more than the thoracic segments beyond the neck of the cocoon, a silken cable secured to its anal armature preventing it from over-passing the point of security and falling to the ground. The pupa at first is unicolorous, green with darker green mediodorsal line on abdomen. The first colour-change is noticed in the eyes, which become red, then a reddish colour spreads over the face parts, next the thorax and wings show imaginal markings. The duration of the pupal stage is from 17 to 29 days.*

The perfect insect usually appears from November till March, and stragglers are occasionally met with during the winter months. It is found in the vicinity of forest, but is never common. The female is often found resting on the upper surface of a leaf of its foodplant when its appearance is suggestive of a small crumpled dead leaf adhering to the green leaf.

Genus 9.—CTENOPSEUSTIS, Meyr.

Antennae in male shortly ciliated. Palpi moderate, porrected, second joint with projecting scales above and beneath, terminal short. Thorax without crest. Fore-wings with vein 7 separate, to termen. Hind-wings with cubital pecten, veins 3 and 4 connate, 5 approximated to 4 at base, 6 and 7 closely approximated towards base. (Plate F., figs. 1, 2 neuration of *Ctenopseustis obliquana*; fig. 3 head of ditto.)

Represented by a single very variable species only.

CTENOPSEUSTIS OBLIQUANA.

(*Teras obliquana*, Walk., Cat., xxviii., 302; *Teras spurcutana*, ib., 305; *servana*, ib., 306; *priscana*, ib., 307; *Sciaphila transtrigana*, ib., 354; *turbulentana*, ib., 355; *Teras cuneiferana*, ib., xxxv., 1780; *contractana*, ib., 1782; *Teras congestana*, ib., xxviii., 308; *Tortrix ropeana*, Feld., Reiss., Nov., pl. cxxxvii., 45; *taipana*, ib., 46; *herana*, ib., 52; *inana*, Butl., Proc. Zool. Soc. Lond., 1877, 403; *Cacoecia spurcutana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 487; *Pachysca obliquana*, Meyr., Trans. N.Z. Inst., xv., 60; *Ctenopseustis obliquana*, ib., xvii., 146.)

(Plate XXV., figs. 3-6 ♂ varieties; 7-10 ♀ ditto.)

This extremely variable species is common and generally distributed throughout the country.

The expansion of the wings of the male is about $\frac{3}{4}$ inch, of the female slightly over 1 inch. The fore-wings of the male have the costa slightly arched, the apex pointed and the termen curved; dull ochreous-brown to dark chocolate-brown with darker

brown markings; there is a short, oblique band from the dorsum near the base, not reaching the costa; a very irregular wavy central band, usually containing a rather large, pale spot on the costa beyond the middle and often broken up or obsolete towards the dorsum; a distinct patch near the termen below the apex. The hind-wings are pale brownish-grey, mottled with darker grey. In the female the wings are longer; the fore-wings vary from pale whitish-ochreous to reddish-brown; there are two short oblique dark brown marks on the costa near the base; the outer edge of the central band faintly indicated, and a more or less indistinct darker patch on the termen below the apex. The hind-wings vary from dull white to pale grey, more or less mottled with darker grey.

The following are a few of the principal varieties:—

A. MALES:

- (1.) Fore-wings deep chocolate-brown with two large and two small brown spots (fig. 4).
- (2.) Fore-wings with space between basal and central areas very pale brownish-ochreous (fig. 5).
- (3.) Fore-wings with central area much clouded with black (fig. 6).
- (4.) Fore-wings very dark dull brown with all markings faintly indicated by paler and darker mottling.

B. FEMALES:

- (1.) Fore-wings almost white with markings very indistinct.
- (2.) Fore-wings very pale ochreous-brown with markings darker.
- (3.) Fore-wings pale brown.
- (4.) Fore-wings reddish-brown with very indistinct markings. (This variety can only be separated from some of the varieties of *Tortrix excessana* by the structural characters).
- (5.) Fore-wings ochreous with markings and extensive mottlings black.
- (6.) Fore-wings with central area black and terminal areas ochreous (fig. 10). This is a rare and striking form and corresponds to variety No. 3 of the male.
- (7.) Fore-wings pale ochreous-grey with veins marked in darker grey (fig. 7).

The larva is polyphagous. It has been found feeding on the flower heads of the Wharangi (*Brachyglottis repanda*), the leaves of *Coprosma rotundifolia*, *Aristotelia racemosa*, *Macropiper excelsum*, *Myrtus bullata*, *Carpodetus serratus*, *Olearia cunninghami*, *Veronica*, *Lonicera*, *Rumex*, etc. It also feeds on the kernel of the peach and this habit is sometimes productive of loss as it prevents the peaches from ripening. When opened, the infected peaches disclose a burrow, extending through the stone and pulp of the fruit, which has been specially prepared by the larva for the exit of the perfect insect, the pupa being enclosed in a silken cocoon in the centre of the peach stone. This larva is very active and when living in twisted leaves travels from end to end of its habitat in the usual *Tortrix* fashion. In such cases the pupa is enclosed in a silken cocoon inside the twisted leaf which had been tenanted by the larva.

The full-grown larva is rather stout, flattened, attenuated at both ends; brilliant green or dull whitish with the head and succeeding segment brown, the dorsal line

*See paper by Ambrose Quail, F.E.S., in Trans. N.Z. Inst., xxxvii., 343, from which the life history here given has been abridged.

dark green and the segmental divisions yellow; there are a few hairs scattered over the body.

Latterly the larva of this insect has taken to feed on the common broom (*Cytisus scoparius*) joining up the terminal shoots and feeding on the small leaves. This new habit will enable the species to increase its numbers indefinitely. It is also causing serious damage to various species of introduced pines (*Pinus radiata*, *P. strobus* and others) by twisting up and feeding on the growing points.

The perfect insect may be found throughout the entire year, but is of course commonest during the summer months. The darker varieties are often dislodged from the dead fronds of tree-ferns in the depths of the forest, but the insect is also abundant in gardens and other cultivated places and frequently enters houses. It is indifferent to low temperatures, and is often seen during the coldest weather in the depth of winter.

Genus 10.—*GELOPHAULA*, Meyr.

Antennae in ♂ stout, simple, or very minutely pubescent. Palpi long, porrected, clothed with dense rough scales diminishing to apex, beneath with long rough hairs towards base, in ♀ less developed. Thorax without crest. Fore-wings with veins 7 and 8 separate, 7 to termen. Hind-wings without cubital pecten, 3·5 approximated at base, 6 and 7 closely approximated at base or short-stalked.

(Plate F., figs. 4, 5 neurulation of *Gelophaula siraea*;
fig. 6 head of ditto.)

There are eight New Zealand species, all confined to the South Island. These are rather large, stoutly built insects, of striking appearance, which inhabit the mountains, and exhibit remarkable differences between the sexes. These species, which are closely allied, are very imperfectly known at present, and others no doubt remain to be discovered. Entomologists, working in mountainous country, will do well to give these insects their special attention.

GELOPHAULA TRISULCA.

(*Harmologa trisulca*, Meyr., Trans. N.Z. Inst., xlviii., 414.)

(Plate XXV., fig. 15 ♂, 16 ♀.)

This very striking insect has occurred commonly at Arthur's Pass.

The expansion of the wings of the male is 1½ inches; of the female 1¾ inches. Very closely allied to *Gelophaula aenea*, from which it differs in the following respects:—The male has a very broad longitudinal deep reddish-chocolate-brown band on the costa, the extreme costal edge not being margined with greyish-white; the dorsum is broadly clouded with warm brown, a central band of bright ochreous-yellow remaining. The hind-wings are dark blackish-brown, paler towards the base. In the female the fore-wings are dull ochreous-yellow tinged with grey; the veins usually distinctly visible. The hind-wings are whitish-ochreous, faintly clouded with grey towards the dorsum.

The perfect insect appears in January, and is sometimes common on the mountain side from 3,000 to 4,000 feet above the sea-level. The male flies freely in hot sunshine, but the female usually remains hidden amongst the rough vegetation.

GELOPHAULA AENEA.

(*Teras aenea*, Butl., Proc. Zool. Soc. Lond., 1877, 402; *Harmologa aenea*, Meyr., Trans. N.Z. Inst., xv., 46.)

This insect has occurred at Porter's Pass, Arthur's Pass and Mount Hutt.

The expansion of the wings of the male is 1½ inches, of the female 1¾ inches. The fore-wings are oblong, hardly dilated, in male moderately broad, in female narrower, costa moderately arched, termen not oblique, in male gently rounded, in female sinuate beneath apex; dull greyish-fuscous, irregularly suffused in male with golden-ochreous-yellow, in female with light yellowish-ochreous; in male extreme costal edge whitish, except near base, in female costa narrowly white throughout: cilia in male ochreous-grey-whitish, basal half suffused with yellowish, in female white, base ochreous-tinged. Hind-wings in male deep ferruginous-yellow mixed with dark grey, especially posteriorly, so as sometimes to form a broad, dark terminal band, and an obscure discal spot beyond middle, costa towards middle broadly paler, cilia whitish-yellow, at base and on tornus ferruginous-yellow; in female dull white, becoming broadly pale yellow posteriorly, cilia white, at base pale yellow. Conspicuous by its large size and distinctly coloured hind-wings.

The perfect insect appears in January.

I am unacquainted with this species. The above is taken from Mr. Meyrick's description.

GELOPHAULA PALLIATA.

(*Harmologa palliata*, Philp., Trans. N.Z. Inst., xlv., 120.)

(Plate XXV., fig. 35 ♂; Plate XLIV., fig. 25 ♀.)

This very distinct species was discovered by Messrs. A. Hamilton and G. W. Howes on the Old Man Range, Central Otago. It has since been taken by Mr. Philpott on the Takitimu mountains, Southland.

The expansion of the wings of the male is nearly 1 inch, of the female ¾ inch. The fore-wings of the male are oblong with the termen obliquely-rounded; dark blackish-grey thickly strewn with yellowish scales. The hind-wings are very dark bronzy-brown with an orange-yellow patch on the costal edge, where covered by the fore-wings, and a few greenish scales near the dorsum. A form, probably correctly identified as the female of this species, has the fore-wings very pale grey, densely speckled with darker grey. The hind-wings are whitish-ochreous, densely speckled with grey.

The perfect insect appears from December till February, and is found on open mountain country at elevations of about 3,500 feet above the sea-level.

Described and figured from specimens kindly given to me by Mr. A. Hamilton.

GELOPHAULA TRITOCHLORA.

(*Harmologa tritochlora*, Meyr., Trans. N.Z. Inst., xlv., 120.)

(Plate XXVII., fig. 3 ♀.)

Two female specimens of this rare and interesting species have been taken on the high open country around Lake Harris beyond the head of Lake Wakatipu.

The expansion of the wings is slightly over ¾ inch. The fore-wings of the female are elongate-oblong with the apex rather acute and the termen obliquely-rounded; rather pale ochreous; there are two patches of thinly-scattered grey scales in the disc,

extending from the base to about $\frac{1}{2}$. The hind-wings are creamy-white narrowly margined with yellow-ochreous and with several scattered greyish-brown scales near the dorsum.

The male is unknown but, judging from the allied species of similar habits, is likely to be very much darker in colour, with possibly distinct markings on the fore-wings.

The perfect insect appears in February, and evidently frequents mountainous country at altitudes of about 4,000 feet.

GELOPHAULA TRIBUTARIA.

(*Harmologa tributaria*, Philp., Trans. N.Z. Inst., xlv., 77.)

(Plate XXV., fig. 34 ♂.)

This species, which is evidently very closely allied to *Gelophaula siraea* and *G. lychnophanes*, was discovered by Messrs. G. Howes and A. Hamilton at Obelisk, Old Man Range, Central Otago.

The expansion of the wings of the male is about 1 inch. It differs from the same sex in *G. siraea* in the following respects: The termen is more oblique; the costa and dorsum are broadly edged with blackish-brown and the veins marked in the same colour, which thus much reduces the extent of the bright reddish-brown area; the central streak is broad, well defined, pale yellow and divided into two unequal branches from $\frac{1}{2}$, thus enclosing a long triangular patch of the ground colour. The hind-wings are very dark blackish-grey, paler towards the base.

The perfect insect appears in February, and frequents open mountainous country at elevations of between 3,000 and 4,000 feet above the sea-level.

Described and figured from specimens kindly forwarded to me by Messrs. Hamilton and Philpott.

GELOPHAULA SIRAEA.

(*Harmologa siraea*, Meyr., Trans. N.Z. Inst., xvii., 145.)

(Plate XXV., fig. 13 ♂; 14 ♀.)

This species, which is closely allied to the two preceding, has occurred at Mount Arthur, Arthur's Pass and Hunter Mountains, at elevations of about 4,500 feet above the sea-level.

The expansion of the wings of both sexes is slightly over 1 inch. The fore-wings of the male are dull reddish-brown with a large, irregular, dull yellow, central streak, broadest near the termen and sometimes showing a tendency to divide; there is a leaden grey stripe along the costa, the extreme edge being dull white. The hind-wings are uniform dull greyish-brown. The female has the fore-wings dull white and the hind-wings pale whitish-ochreous.

The perfect insect appears in December and January, and frequents open grassy slopes on the mountains, at elevations of about 4,500 feet above the sea-level. According to my experience the male is very much commoner than the female, but this is probably due to the more secretive habits of the latter sex.

GELOPHAULA LYCHNOPHANES.

(*Harmologa lychnophanes*, Trans. N.Z. Inst., xlviii., 415.)

(Plate XLVIII., fig. 13 ♂.)

This very bright-looking species has occurred on the Mount Arthur Tableland and at Arthur's Pass at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is about 1 inch. The male is very like the same sex in *G. siraea*, but has a very broad reddish-brown costal stripe with an irregular leaden-grey edging; a very bright yellow median blotch and a bright brown dorsal and terminal shading. The hind-wings are bright brownish-ochreous, narrowly bordered with warm brown on the termen.

The female is unknown.

The perfect insect appears in January, and frequents open mountainous country.

GELOPHAULA BREVICULA.

(*Harmologa brevicula*, Meyr., Trans. N.Z. Inst. liii., 334.)

(Plate XLIX., fig. 29 ♂, 30 ♀.)

This species has occurred on Arthur's Pass at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings of the male is nearly $\frac{3}{4}$ inch; of the female almost 1 inch. The fore-wings of the male are dull whitish-ochreous; there is a broad band of grey along the costa rapidly narrowing towards the apex; several ill-defined grey streaks near the termen and an irregular grey shading along the dorsum, almost meeting the costal band at the base. The hind-wings are brownish-grey. The cilia of the fore-wings are grey; of the hind-wings white. In the female the fore-wings are almost wholly pale ochreous and the hind-wings almost white, finely speckled with brown towards the dorsum.

This species is smaller and shorter-winged than *Gelophaula siraea*, and the female has the termen much less oblique than in the same sex of *G. tritochlora*.

The perfect insect appears in February, and is found amongst rough herbage on the mountain side.

(Genus II.—EPICHORISTA, Meyr.)

Antennae in ♂ moderately or rather strongly ciliated. Palpi moderate or long, porrected, second joint dilated with dense scales above and beneath. Thorax without crest. Fore-wings with veins 7 and 8 separate, 7 to termen. Hind-wings without cubital pecten, 3-5 approximated at base, 6 and 7 closely approximated at base or short-stalked.

(Plate E., figs. 34, 35 neurulation of *Epichorista emphanes*; fig. 36 head of ditto.)

We have twelve species, three confined to the North Island, seven to the South Island, and two common to both Islands.

EPICHORISTA HEMIONANA.

(*Proscelena hemionana*, Meyr., Trans. N.Z. Inst., xv., 43.)

(Plate XXVI., fig. 33 ♂.)

This very distinctly-marked species has occurred at Lake Guyon, Arthur's Pass, Dunedin, Humboldt Range and Paradise, Lake Wakatipu.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings have the costa slightly arched at the base, the apex somewhat pointed and the termen straight and oblique; dull ochreous; there are two ill-defined brown spots near the base; a broad, oblique, reddish-brown band from about $\frac{1}{2}$ of costa to about middle of dorsum, very sharply defined towards the base and ill-defined towards the termen; three minute black marks are situated on the costa near the apex and a brown spot on the wing before the apex. The hind-wings are rather dark grey and the cilia of all the wings ochreous.

The perfect insect appears from January till April. It is apparently very local. I took one specimen on the Humboldt Range at an elevation of 3,600 feet above the sea-level.

EPICHORISTA ELEPHANTINA.

(*Proscelena elephantina*, Meyr., Trans. N.Z. Inst., xvii., 143.)

(Plate L., fig. 16 ♂.)

This species was discovered by Mr. Meyrick on Arthur's Pass at an elevation of 4,700 feet above the sea-level.

The expansion of the wings is about 1 inch. The fore-wings are bright brownish-ochreous with a darker longitudinal streak in the disc; there are numerous small black spots arranged in rows on the basal area, above the dorsum, and parallel to the termen. The hind-wings are pale ochreous dappled with grey.

"Singularly distinct by its comparatively gigantic size, pale colouring, and blackish discal line."

The perfect insect appears in January, and may be looked for on grassy mountain slopes between 4,000 and 5,000 feet above the sea-level.

Described and figured from a specimen kindly supplied by Mr. Philpott.

EPICHORISTA PERSECTA.

(*Epichorista persecta*, Meyr., Trans. N.Z. Inst., xli., 104.)

(Plate XLV., figs. 20, 21 ♂ varieties; Plate XXVI., fig. 19 variety *semicocta*.)

This rather inconspicuous species was discovered by Mr. Philpott at Tisbury and West Plains near Invercargill. It has also occurred at Dunedin and Queenstown.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are very pale brown with blackish markings; there is an indistinct basal patch; a broad indistinct oblique band from the costa before the middle, often represented by a discal mark only, and a series of minute marks on the dorsum; there is a black spot on the sub-terminal area below the apex and a number of extremely minute irregular scattered black dots. The hind-wings are whitish-ochreous with coarse grey mottling.

Mr. Philpott informs me that this species is extremely variable in its markings. The remarkable form known as *semicocta* has the fore-wings bright brownish-ochreous, darker towards the disc and costa and with a large, cloudy whitish patch on the dorsal area; there are three black dots and a large black spot near the base; a conspicuous oblique black bar on the costa before the middle; a small semi-circular brown costal patch beyond the middle; there is a series of black sub-terminal dots with a much larger spot near the middle of the series and three chains of minute black dots near the dorsum. The hind-wings are white with pale ochreous cilia.

The perfect insect appears from November to February, and frequents forest. It is a rare species.

Described and figured from specimens in Mr. Philpott's collection.

EPICHORISTA TENEBROSA.

(*Epichorista tenebrosa*, Philp., Trans. N.Z. Inst., xlix., 243.)

(Plate XLVIII., fig. 10 ♂, 11 ♀.)

This very dull-looking species has occurred on Ben Lomond, Lake Wakatipu.

The expansion of the wings of the male is slightly over 1 inch; of the female about $\frac{1}{2}$ inch. The fore-wings are dull slate colour slightly purplish-tinged and speckled with darker; there are numerous very wavy, irregular, very broken, rusty orange transverse lines, strongest on the basal, discal and sub-terminal areas. The hind-wings are dull greyish-ochreous. In the female the ground colour of the fore-wings is paler and the darker speckling more in evidence; there is also a distinct blotch of rusty-orange in the disc and the hind-wings are faintly dappled with grey.

The perfect insect appears in late February. It was found at an altitude of about 4,000 feet above the sea-level amongst short grasses between the tufts of tussock.

Described and figured from specimens kindly lent to me by Mr. C. E. Clarke.

EPICHORISTA SIRIANA.

(*Proselena siriana*, Meyr., Proc. Linn. Soc. N.S. Wales, 1881, 521; Trans. N.Z. Inst., xv., 43.)

(Plate XXVI., fig. 34 ♂.)

This rather bright-looking little species has occurred at Hamilton and Wellington in the North Island. It is apparently represented in the South Island by the closely allied *Eurythecta eremana*.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather narrow with the apex acute and the termen very rounded and oblique; dark ochreous, slightly speckled with blackish-grey; there is a blackish discal dot; the cilia are brownish-ochreous, paler towards the tornus. The hind-wings are blackish-grey, darker towards the termen.

According to Mr. Meyrick this species is markedly distinct by its unicolorous fore-wings and the strongly contrasted hind-wings.

The perfect insect appears in January, and occurs amongst long grass, often in cultivated places. It is usually rather rare in the vicinity of Wellington and apparently very local like most of the species of the genus.

EPICHORISTA ASPISTANA.

(*Proselena aspistana*, Meyr., Trans. N.Z. Inst., xv., 42.)

(Plate XXVI., fig. 32 ♂.)

This neatly-marked little insect has occurred at Porter's Pass and Castle Hill on the West Coast Road at elevations of about 2,500 feet above the sea-level. It has also been found at Woodhaugh and Waitati, near Dunedin.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings have the costa arched at the base, thence almost straight to the apex, the termen slightly oblique; pale ochreous; a very distinct basal patch of reddish-brown reaching to $\frac{1}{2}$ of costa and dorsum; a large pale centred elliptical patch of the same colour on the costa from about $\frac{1}{2}$ to a little before the apex; a few faint minute reddish-brown marks on the paler portions of the wing. The hind-wings are brownish-grey. The cilia of all the wings are also

brownish-grey. The female is smaller with the wings narrower; there is a large, pale patch at the extreme base of the fore-wings converting the basal marking into a broad band and the pale central portion of the large costal patch is much more pronounced than in the male.

The perfect insect appears in January. It frequents damp grassy places, but seems to be very local.

EPICHORISTA ERIBOLA.

(*Proselena eribola*, Meyr., Trans. N.Z. Inst., xxi., 156.)

(Plate XLV., fig. 13 ♂.)

This very dark-looking little insect has occurred at Otira and at Pohorua near Greymouth.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are rich brown with dull purplish-grey reflections; there is a mottling of clear bright brown; a wavy, clear brown band from about $\frac{1}{3}$ of costa to the dorsum before the tornus and a narrower curved band from the costa before the apex, reaching a little more than half across the wing. The hind-wings are deep blackish-brown.

The perfect insect appears in January, and frequents damp forests, sometimes ascending as high as 3,000 feet above the sea-level.

EPICHORISTA ZATROPHANA.

(*Harmolaga zatrophana*, Meyr., Trans. N.Z. Inst., xv., 46; *Proselena zatrophana*, ib. xvii., 144.)

(Plate XLV., fig. 16 ♂.)

This bright-looking little insect was discovered by Mr. Meyrick on Arthur's Pass in January, 1883, at an elevation of about 3,000 feet above the sea-level. It was also taken at Christchurch about the same period, but so far as I am aware, has not been detected by subsequent collectors.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are oblong with the costa strongly arched, warm yellowish-brown clouded with leaden grey on the sub-terminal area; the basal patch is yellowish-brown and is followed by an ill-defined silvery grey band; there is a broad oblique orange-brown costal bar near the middle reaching more than half-way across the wing; beyond this are several irregular yellowish-brown blotches with silvery-grey lines between them. The hind-wings are bronzy-grey.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

EPICHORISTA EMPHANES.

(*Proselena emphanes*, Meyr., Trans. Ent. Soc. Lond. 1901, 571; *Harmolaga achrosta*, Meyr., ib. 572; *Harmolaga epicura*, Meyr., Trans. N.Z. Inst., xliii., 86; *Epichorista theatralis*, Philp., Trans. N.Z. Inst., i., 128; *Epichorista candida*, Clarke, ib. lvi., 419.)

(Plate XXVI., fig. 15 ♂; fig. 30 ♀, 31 ♀ variety.)

This very variable species has occurred in the North Island at Gollan's Valley and Wainuiomata near Wellington. In the South Island it has been found on the Dun Mountain, Mount Arthur, Castle Hill, Routeburn Valley, Lake Wakatipu, and Lake Manapouri, at elevations of from about 200 to 5,000 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather elongate with the termen almost straight and slightly

oblique. In the male the ground colour varies from dark brownish-black to dull yellowish-brown; there are often a few very scattered yellow scales becoming more numerous towards the termen; sometimes a patch of steely-bluish scales on the disc beyond the middle and usually similar but much smaller patches between the veins near the termen. The hind-wings are dark brown or brownish-black. In the female the fore-wings are usually deep reddish-brown irregularly speckled with bright ochreous. There is generally a very broad oblique faint silvery-purple band from $\frac{1}{2}$ of costa to $\frac{1}{2}$ of dorsum; a rather narrow outwards-curved silvery-white mark on the costa at about $\frac{1}{2}$, followed by a spot beyond the middle of the wing; there are several small silvery-white marks near the apex and termen and the cilia are reddish-ochreous. The hind-wings and cilia are dark brownish-grey.

There is considerable variation in the brilliancy of the general colouring as well as in the extent and intensity of the silvery-white markings. Sometimes the reddish-brown ground colour of the fore-wings is replaced by dark grey (fig. 31). Generally speaking specimens from the North Island have the fore-wings considerably brighter and redder, the hind-wings darker, and the white costal marking seems to be often absent. A very striking variety of this insect (*Epichorista theatralis*, Philp.), from Mount Cleugharn, Hunter Mountains, is depicted on Plate XLV., fig. 12. Another striking form (*E. candida*, Clarke) has the whole of the median area of fore-wings greyish-cream-colour, traversed by two ochreous-yellow bands. I have a similar specimen taken at Gollan's Valley, near Wellington, where forms intermediate between "*candida*" and the type also occur.

The perfect insect appears from November till February. It usually frequents glades in beech forests, often at considerable elevations, flying actively in hot sunshine. Occasionally it is found above the limit of forest growth and my earliest specimens were captured resting on the snow on Mount Peel (Nelson), at an altitude of about 5,500 feet. A smaller and duller form, found by Mr. Philpott in this locality, is ranked by him as a distinct species, under the name of *Epichorista abdita*.*

EPICHORISTA ALLOGAMA.

(*Harmolaga allogama*, Meyr., Trans. N.Z. Inst., xlii., 105.)

(Plate XXVI., fig. 20 ♂, 21 ♀.)

This richly-coloured little species has occurred commonly in my garden at Karori and on the hills on the Eastern side of Wellington Harbour.

The expansion of the wings of the male is about $\frac{1}{2}$ inch; of the female nine-sixteenths of an inch. The fore-wings are very deep purplish-brown; there is a small, very bright, reddish-brown patch on the costa before the apex and the termen is narrowly edged with reddish-brown; a large oblong patch of dull greenish-grey scales is situated near the middle of the dorsum. The hind-wings are very dark blackish-brown. The female has a very large semicircular creamy yellow mark occupying about half of the costal edge.

A variety occasionally occurs in which the fore-wings are entirely cream-coloured.

*Trans. N.Z. Inst., Iv., 664.

The perfect insect appears towards the end of December, and frequents the foliage of *Pittosporum tenuifolium*, upon which its larva probably feeds. It flies with a short rapid flight during the afternoon and early evening. It is on the wing for a very short season and is apparently very local, although abundant where found.

EPICHORISTA CRYPSIDORA.

(*Dipterina crypsidora*, Meyr., Trans. N.Z. Inst., xli., 11; *Epichorista carcharodes*, ib., xli., 104.)

(Plate XXVI., fig. 24 ♂; 25 ♀.)

This little species was discovered by Mr. Philpott at West Plains near Invercargill. It has since occurred at Kaero, North of Auckland, Mount Holdsworth and Wellington.

The expansion of the wings is considerably over $\frac{1}{2}$ inch. The fore-wings of the male are very deep yellowish-brown with numerous scattered black scales; there is a series of short blackish costal bars; several narrow, wavy, oblique, dark grey transverse lines and a fine dark grey sub-terminal line; the dark markings are often obscurely margined with dull white; on the underside of the fore-wings there is a distinct reddish-brown longitudinal stripe. In the female the fore-wings are brownish-ochreous, irregularly reticulated with deep yellowish-brown; there are two patches of yellowish-brown on the costa; a cloudy patch of dark brown on the dorsum near the base and a larger patch near the tornus. The hind-wings of both sexes are dark blackish-brown.

The perfect insect appears from November till January, and frequents open glades in forest or scrub, but is rarely met with. It flies rapidly in hot sunshine.

EPICHORISTA TRIORTHOTA.

(*Epichorista triorthota*, Meyr., Trans. N.Z. Inst., lvii., 698.)

(Plate LII., fig. 28 ♂.)

Single specimens of this species have occurred at Wilton's Bush and Wainuiomata near Wellington.

The fore-wings are rather broad with the termen almost straight; bronzy-purplish-brown, darker on outer half; basal patch finely margined with chocolate-brown; a broad pale brown almost straight transverse band before middle, followed by a rather irregular chocolate-brown band; a narrow, wavy chocolate-brown transverse band from $\frac{1}{2}$ of costa to near tornus; another straighter sub-terminal band; the veins on the sub-terminal area are finely marked in chocolate-brown; the cilia are bright ochreous-brown. The hind-wings and cilia are dark brown.

The perfect insect appears in December and may be looked for in forest.

Genus 12.—HARMOLOGA, Meyr.

Antennae in ♂ moderately or rather strongly ciliated. Palpi moderate or long, porrected, second joint dilated with dense scales above and beneath. Thorax with small posterior crest. Fore-wings with veins 7 and 8 separate, 7 to termen. Hind-wings without cubital pecten, 3-5 approximated at base, 6 and 7 closely approximated at base or short-stalked.

Represented in New Zealand by ten species, of which eight are confined to the South Island, and two common to both islands.

HARMOLOGA OBLONGANA.

(*Teras oblongana*, Walk., Cat., xxviii., 303; *Cacoecia oblongana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 489; *Harmologa oblongana*, Trans. N.Z. Inst., xv., 45; *Teras inaptana*, Walk., Cat., xxviii., 304; *Teras cuneigera*, Butl., Cist., Ent., ii., 559.)

(Plate XXVI., fig. 16 ♂.)

This very dull-coloured obscure-looking species has occurred at Blenheim, Nelson, Christchurch, Dunedin, and Lake Wakatipu. It has not been observed in the North Island at present.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dull brownish-grey, slightly darker over a large central area; there are numerous short, blackish-brown, wavy streaks spread over the entire wing and a paler greyish patch near the apex extending as a curved band along the termen. The hind-wings are brownish-ochreous, darker at the apex and mottled with brown near the dorsum.

This species is stated to be rather variable in colour and varies in intensity of marking, but is easily separated from all other species of the genus by its dull grey hue. Butler's *cuneigera* is founded on a light-coloured specimen, from Blenheim, with strongly marked costal blotch.

Mr. Meyrick states that the larva feeds, in a dense web, on Wild Irishman (*Discaria toumatou*) and probably other plants.

The perfect insect appears from December till March and is found amongst Manuka scrub (*Leptospermum*).

HARMOLOGA AMPLEXANA.

(*Idiographis* (?) *amplexana*, Z., Z.B.V., 1875, 222; *Cacoecia amplexana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 494; *Cacoecia vitis*, Butl., Proc. Z.S.L., 1877, 402, pl. xliii., 15; *Harmologa amplexana*, Meyr., Trans. N.Z. Inst., xv., 47.)

(Plate XXIV., fig. 2 ♂; 3 ♀; Plate III., fig. 3 larva.)

This species has occurred at Wellington, Christchurch, Greymouth, Dunedin, Lake Wakatipu and Invercargill and is probably generally distributed throughout the country.

The expansion of the wings of the male is slightly under $\frac{1}{2}$ inch, of the female slightly over $\frac{1}{2}$ inch. The fore-wings of the male have the costa strongly arched at the base, the apex pointed and the termen curved; in the female the costa is very strongly arched at the base, becoming concave before the apex, which is very prominent, the termen being very strongly bowed outwards; very pale ochreous with brown markings; there is a narrow, very dark band from $\frac{1}{2}$ of costa extending obliquely inwards to the disc, thence abruptly to the base—this marking is smaller, fainter and much more curved in the female; an oblique band from before the middle of the costa to the middle of the dorsum, sharply defined towards the base, shaded towards the termen, but obsolete towards the costa in the male; an elongate curved mark on the costa from the middle almost to the apex, much larger and touching the central band in the male; several small markings near the termen, including a brownish-patch near the middle edged towards the termen with from two to four blackish dots; in both sexes the whole wing is very finely dotted and streaked with minute brown marks. The hind-wings are pale yellowish-ochreous with grey mottling.

Mr. Meyrick remarks that this species is "remote from all its congeners in superficial appearance; the peculiar angulated sub-costal mark at the base (differing in the sexes), is unique in its way, but only conspicuous in the male."

The perfect insect appears from January to March and again in August. It frequents forests and gardens, but it does not appear to be generally common in such situations.

HARMOLOGA SCOLIASTIS.

(*Trachybatra scoliastis*, Meyr., Trans. N.Z. Inst., xxxix., 113.)

(Plate XXIV., fig. 4 ♀.)

This rather obscurely-marked species was discovered at the head of Lake Wakatipu, and has also occurred on Mount Aorangi. It is stated to be generally distributed in the extreme south, although not common.

The expansion of the wings of the male is $\frac{3}{4}$ inch, of the female about $\frac{3}{4}$ inch. The fore-wings are rather narrow and oblong with the costa slightly bent before the middle; dull yellowish-grey; there are several minute black marks near the base; a rather broad oblique black bar in the disc at about $\frac{1}{4}$, emitting several short black lines towards the termen and with a smaller black bar above it; there is an obscure pale brownish-grey sub-terminal band edged with blackish-grey spots towards the tornus; in addition to these markings the fore-wings are more or less dappled with dull brown especially on the costa and dorsum. The hind-wings are dull orange-yellow with a cloudy brown border and numerous faint brown spots.

The perfect insect appears in January and February. It frequents the open country on the banks of the Dart River at the head of Lake Wakatipu, where it may be dislodged from the foliage of the Wild Irishman (*Discaria toumatou*), a plant which grows very freely in that locality.

HARMOLOGA SISYRANA.

(*Harmologa sisyrana*, Meyr., Trans. N.Z. Inst., xv., 44; *Harmologa antitypa*, ib. xvi., 105.)

(Plate XXVI., fig. 17 ♀.)

This very obscure-looking species has been taken at Auckland, Wellington, Christchurch, Dunedin and Wedderburn (Central Otago.)

The expansion of the wings varies from $\frac{3}{4}$ to $\frac{1}{2}$ inch. The thorax is crested. The fore-wings are rather elongate-oblong with lighter and darker grey markings; there is a conspicuous, very irregular, dark edged, pale band at about $\frac{1}{4}$; a broad, irregular, pale centred, central area; a winding, rather pale grey, sub-terminal band from the apex to the tornus, very indistinct in the female. The hind-wings are pale grey mottled with darker grey. The female is larger and paler than the male.

The larva is somewhat flattened, almost uniform in thickness, slightly tapering posteriorly; the head is dull ochraceous with four pale brown stripes and several dots; the body pale green with two very broad, rather irregular, clear white dorsal lines interrupted at each segmental division; there is a broad dark green sub-dorsal line and a wavy whitish lateral ridge; the lower portions of the larva are very pale green; segments 3 and 4 have a single row of blackish warts, the other segments, except the last, a double row; each wart emits a bristle; the length of the full-grown larva is about $\frac{3}{4}$ inch.

This larva is active in its habits constructing a silken gallery amongst the dense foliage of the Tauhinu (*Cassinia leptophylla*), on which it feeds during the spring and early summer.

The pupa is enclosed in the larval habitat.

The perfect insect appears from November till April. It is found in open situations where its foodplant is common, and is often taken on sand-hills near the sea-coast, but is never very abundant.

HARMOLOGA PONTIFICA.

(*Harmologa pontifica*, Meyr., Trans. N.Z. Inst., xliii., 74.)

(Plate XXV., fig. 32 ♂.)

This very beautiful and distinct species has occurred on the Mount Arthur Tableland, but is very rare.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are oblong with the termen very slightly oblique; very delicate purplish-bronzy-brown; there is a very distinct pale grey oblique transverse band at about $\frac{1}{4}$, broadest near the dorsum; a cloudy central band and a well-defined, inwards-curved, sub-terminal band; there are two cloudy reddish-brown patches on each side of the first band; an elongate black discal dot in the central band and a reddish-brown shading along the edges of the sub-terminal band; the costal region is considerably darker, especially near the edges of the transverse bands; there are numerous scattered minute brown streaks over the entire wing. The hind-wings are rather pale brown faintly mottled with darker brown.

The perfect insect appears in January, frequenting open mountainous country at an elevation of about 4,000 feet above the sea-level.

HARMOLOGA FESTIVA.

(*Harmologa festiva*, Philp., Trans. N.Z. Inst., xlvii., 199.)

(Plate XXVII., fig. 21 ♂.)

This bright-looking species was discovered by Mr. Philpott on Mount Cleughearn near Lake Monowai, at an altitude of about 3,000 feet.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are oblong with the termen nearly straight, bright orange-brown clouded with dull bluish-grey in the disc and towards the apex; there is an oblique elongate-triangular whitish patch reaching from the costa at $\frac{1}{4}$ to the middle of the dorsum; a short white bar on the middle of the costa and an almost straight white sub-terminal band; all these white markings are edged with broken black lines. The hind-wings are dark greyish-black.

The perfect insect appears in January, and is found amongst sub-alpine veronicas and other shrubs.

HARMOLOGA SANGUINEA.

(*Harmologa sanguinea*, Philp., Trans. N.Z. Inst., xlvii., 199.)

(Plate XXVII., fig. 14 ♂.)

This brightly-coloured species was found by Mr. Philpott on Mount Cleughearn, Hunter Mountains, at an altitude of 3,000 feet.

The expansion of the wings is nearly $\frac{1}{2}$ inch. It is rather like *H. festiva* but with the ground colour tinged with purple and

forming ill-defined patches in the disc and towards the apex; the sub-basal triangular marking is much more acute on the costa and wider on the dorsum than in *H. festiva* and there are oblique pale bars at the tornus and at the apex, but no straight subterminal band. All the pale markings are heavily mottled with deep orange-red. The hind-wings are brownish-grey.

The perfect insect appears in January, and frequents sub-alpine scrub.

HARMOLOGA COLUMELLA.

(*Harmologa columella*, Meyr., Trans. N.Z. Inst., lvii., 699.)

(Plate LII, fig. 4 ♂.)

This species was discovered by Stella Hudson on Arthur's Pass at an altitude of about 4,000 feet above sea-level. It has also occurred on Mount Arthur.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are deep yellowish-brown, with speckled white markings, more or less outlined in darker brown; an obscure oblong mark on dorsum near base; an irregular transverse band from $\frac{1}{2}$ of costa to near middle of dorsum, narrower at each end; the terminal third of wing is more or less heavily sprinkled with white, with the exception of a large diffused triangular brown patch on costa near apex, and a very conspicuous elongate-oblong patch, standing on tornus, and almost reaching the costal triangle; the cilia are brownish-ochreous, barred with darker brown. The hind-wings and cilia are brownish-ochreous, very faintly streaked with darker.

The perfect insect appears in January and may be looked for on open mountain country, just above the limit of forest growth.

HARMOLOGA RETICULARIS.

(*Harmologa reticularis*, Philp., trans. N.Z. Inst., xlvii., 199.)

(Plate XXVII, fig. 8 ♂.)

This bright-looking variegated species was discovered by Mr. Philpott on Longwood Range near Orepuki, at an altitude of about 2,700 feet above the sea-level.

The expansion of the wings is eleven-sixteenths of an inch. The fore-wings, which are oblong with the termen slightly oblique, are irregularly striped and mottled with rich brownish-yellow, silvery-white and leaden-grey; the basal area is grey with several patches of brownish-yellow followed by an oblique, silvery-white transverse band; the central area has two broad oblique brownish-yellow bands and a faint silvery-white costal bar, the remaining portions being leaden-grey; this is followed by a leaden grey and silvery transverse line; there are two oblique brownish-yellow bars from the costa to the termen separated by a silvery-grey line; the cilia are grey mixed with brownish-yellow. The hind-wings are leaden-grey.

The perfect insect appears in December, and frequents high open country.

HARMOLOGA TOROTERMA.

(*Harmologa toroterma*, Huds., Ent. Mo. Mag., lxi., 221.)

(Plate LII, fig. 23 ♂.)

This very distinctly-marked species was discovered by Mr. C. E. Clarke, at Mount Ida, Central Otago.

The expansion of the wings is almost 1 inch. The fore-wings are elongate-oblong, with the termen almost straight; pale brownish-ochreous, with numerous brown and yellowish-brown

transverse strigulae; a faint suffused purplish-grey basal patch, its outer edge strongly angulated and partly outlined in blackish; another suffused triangular patch on costa before middle, having at its apex a cloudy reddish-brown discal spot; a very distinct fine wavy sub-terminal line, having beyond it a broad pale terminal band containing a row of broken dots; the cilia are pale brown with darker basal line. The hind-wings are pale ochreous, with several series of faint grey spots; the cilia are pale ochreous.

The perfect insect appears in February.

Described and figured from a specimen kindly sent to me by Mr. Clarke.

(Genus 13.—PHILOCRYPTICA, Meyr.)

Antennae in ♂ rather strongly ciliated. Palpi rather short, obliquely ascending, second joint with tolerably appressed scales. Thorax with strong double posterior crest. Fore-wings with veins 7 and 8 separate, 7 to termen. Hind-wings without cubital pecten, 3 approximated at base to 4, 4 and 5 short-stalked, 6 and 7 stalked.

Includes one species.

PHILOCRYPTICA POLYPODII.

(*Harmologa polypodii*, Watt., N.Z. Journal of Science and Technology, iv., 257.)

(Plate XLIX, fig. 33 ♀.)

This very darkly-marked round-winged species was discovered by Mr. Morris N. Watt in the Botanical Gardens at Wellington. It has also occurred at Wanganui.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are broad with the costa very strongly and evenly arched and the termen rounded; in female brownish-ochreous with dull blue, deep red, and yellow-brown markings; there is a broad horizontal dull blue band along the costa from the base to nearly $\frac{1}{2}$ and a very large tornal blotch extending along the termen almost as far as the apex; a broad, very oblique deep red bar extends from the costa at about $\frac{1}{4}$ to the termen below the apex where it joins the tornal blotch; there are several small yellow-brown marks on the dorsum, on the discal edges of the costal band and tornal blotch, and on the pale apical patch; the cilia are blackish. The hind-wings, which have the apex rounded, are deep brown. In the male the fore-wings are almost entirely overspread with dull bluish-black; the red costal bar is very much reduced and margined with black, there are several other indistinct black markings on the costa and in the disc, and a distinct pinkish-ochreous apical patch.

The following particulars are taken from Mr. Watt's observations* on the life history of this interesting species.

The length of the full-grown larva is about $\frac{1}{2}$ inch; cylindrical; ground colour bright green, head and prothoracic shield dark grey-brown; skin transparent, disclosing a bright green alimentary canal and dorsal vessel. It mines the leaves of *Cyclophorus serpens* and, as the leaves are relatively small and the larva voracious, the mine, with its branch galleries, soon occupies the major portion of leaf and causes it to wither, whereupon the larva forsakes the old leaf and enters a fresh one.

*Trans. N.Z. Inst., lv., 336-340.

The pupa is enclosed in a cylindrical cocoon of thin white silk, constructed within the final blotch-mine, the larva having prepared an exit through which the pupa protrudes its anterior portions prior to emergence.

The perfect insect appears in November and December, and may be looked for in forest where *Cyclophorus* is abundant.

Described and figured from a female specimen kindly given to me by Mr. Watt. I have subsequently taken several others, including two males, in the vicinity of Wellington.

Genus 14.—ECCLITICA, Meyr.

Antennae in ♂ strongly fasciculate-ciliated. Palpi rather short, sub-ascending, second joint with short rough scales appressed towards base. Thorax with strong double posterior crest. Fore-wings with veins 7 and 8 separate, 7 to termen. Hind-wings without cubital pecten, 3 and 4 closely approximated at base or almost connate, 5 little approximated, 6 and 7 stalked.

There are two species.

ECCLITICA HEMICLISTA.

(*Dipterina hemiclista*, Meyr., Trans. Ent. Soc. Lond., 1905, 233.)

(Plate XXVI., fig. 14 ♀.)

In general appearance this rather inconspicuous species somewhat resembles *Tortrix molybditis* but, apart from structural characters, may be distinguished from that insect by its larger size and paler colouring. At present it has only been recorded from Wellington.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are dark purplish-grey with numerous obscure wavy dark brown transverse lines; there is a rather large oblique dark brown blotch on the costa near the middle, another at $\frac{3}{4}$ and a smaller one at the apex. The hind-wings are dark brown darker towards the termen.

The perfect insect appears in December and January, and frequents forest. It is a rare species.

ECCLITICA INCENDIARIA.

(*Ecclitica incendiaria*, Meyr., Trans. N.Z. Inst., liv., 164.)

(Plate XLIX., fig. 32 ♀.)

This small, very dark-looking species, has occurred on Mount Egmont, Mount Ruapehu (4,000 feet), and at Day's Bay, on the eastern side of Wellington Harbour.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather elongate-triangular with the costa slightly arched, ashy-grey tinged with purple, the markings, which are very numerous and indefinite, are black mixed with rusty-red; the basal third of the wing is thinly sprinkled with irregular whitish marks; there is an indistinct irregular median band, very narrow on the costa; a narrow very irregular sub-terminal band; three or four short black bars on the costa near apex with white interspaces, the bars more or less mixed with rust-red; the cilia are black mixed with rust-red. The hind-wings are blackish-brown, very dark towards the apex.

Apparently variable in the extent and depth of markings and ground colour.

The perfect insect appears in February, and may be looked for in scrubby forest, especially at high elevations.

Genus 15.—CNEPHASIA, Curt.

Antennae in male ciliated. Palpi moderate or long, porrected, second joint with projecting scales above and beneath, terminal moderate. Thorax sometimes with small crest. Fore-wings with vein 7 separate to termen. Hind-wings with veins 3 and 4 connate,* 5 approximated to 4, 6 and 7 stalked. (Plate F., figs. 7, 8 neurulation of *Cnephasia incessana*; fig. 9 head of ditto.)

A rather extensive genus but principally in temperate regions.

We have nine species in New Zealand, six confined to the South Island, and three common to both islands.

CNEPHASIA INCESSANA.

(*Dipterina incessana*, Walk., Cat. xxviii., 304; Meyr. Proc. Linn. Soc. N.S.W., 1881, 529; Trans. N.Z. Inst., xv., 55.)

(Plate XXV., fig. 19 ♀.)

This species appears to be common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings have the termen slightly curved and oblique; the basal third is rather pale reddish-brown thickly speckled with dull white and traversed by a few short dark brown stripes; the outer edge of the basal patch is clearly defined by a fine, slightly-curved white line; this is followed by a broad, rich brown central shading; there is a triangular shaded patch of dark brown on the costa before the apex; the terminal portion of the wing is thickly speckled with dull white and crossed by numerous fine broken brown, transverse lines; the cilia have a black basal line. The hind-wings are pale brownish-grey faintly spotted with darker grey.

Some specimens are of a warmer brown than others, but beyond this there is little variation.

The perfect insect appears from October till December, and is found in forest, where it is often very abundant. Its colouring is highly protective whilst resting on the ground, or amongst dead leaves.

CNEPHASIA JACTATANA.

(*Batodes jactatana*, Walk., Cat. xxviii., 317; *Dipterina jactatana*, Meyr., Trans. N.Z. Inst., xv., 54; *Sciaphila flexivittana*, Walk., Cat. xxviii., 353; *Paedisca privatana*, ib. 382; *Grapholitha voluta*, Feld. Reis. Nov. pl. cxxxvii., 39.)

(Plate XXV., fig. 17 ♂; 18 ♀.)

This very distinct species is common and generally distributed throughout the country.

The expansion of the wings of the male is barely $\frac{1}{2}$ inch, of the female about $\frac{3}{4}$ inch. The fore-wings have the termen slightly waved but not oblique; rather dark greyish-brown in the male with a very broad, doubly bent, black streak in the disc near the base; there is a series of minute black marks on the costa and a number of obscure brownish dots near the termen. In the female the fore-wings vary from pale brown to pale brownish-ochreous, the markings are the same as in the male except that, in the very pale specimens, there is a dark shading round and beyond the black basal streak as well as three rather large brown spots near the termen. The hind-wings are brownish-grey speckled with darker grey.

Considerable variation exists in the depth of the ground colour and in the intensity of the markings, but the

*Short stalked in *Cnephasia incessana*.

characteristic black basal streak is always very conspicuous.

The perfect insect appears from September till March. It frequents forest and is very inconspicuous when on the ground, or amongst dead leaves. Whilst thus at rest, with its wings closed over its back, the peculiar basal stripes combine to form a figure closely resembling a lyre.

CNEPHASIA LATOMANA.

(*Harmotoga latomana*, Meyr., Trans. N.Z. Inst., xvii., 145.)

(Plate XXVI., fig. 37 ♂, 38 ♀.)

This species has occurred on Mount Arthur (Nelson), and at Arthur's Pass at elevations of about 4,500 feet above the sea-level, also on Bold Peak at the head of Lake Wakatipu.

The expansion of the wings is about $\frac{1}{2}$ inch. The male has the antennae strongly ciliated. The fore-wings have the costa very slightly arched, the termen slightly rounded and hardly oblique; dark reddish-brown with greyish white and black markings; there is an irregular greyish white band from $\frac{1}{4}$ of costa to beyond middle of dorsum, much broader towards the dorsum; a second very short band from middle of costa meeting the third band above and beyond the middle of the wing; the third band is very irregular, oblique, double at the apex, almost meeting the first band before the dorsum; there are two white marks on the costa between the second and third bands; a small patch of greyish-white near the termen above the tornus; usually two rather large black marks on each side of the first band near the middle of the wing and a number of small black dots on the principal veins. The hind-wings are grey, darker towards the termen. The female is slightly larger than the male; the ground colour of the fore-wings dark brown mixed with black; the markings clear white, much more distinct and larger than in the male and the hind-wings clear white, slightly speckled with grey near the termen and dorsum.

There is slight variation in the intensity of the markings of the male.

The perfect insect appears in January, and frequents grassy places high on the mountain sides at elevations of from 4,000 to 4,600 feet. It flies rapidly in the hottest sunshine, but is very local and uncertain in its appearance.

CNEPHASIA MELANOPHAEA.

(*Cnephasia melanophaea*, Meyr., Trans. N.Z. Inst., lviii., 698.)

(Plate LII., fig. 1 ♂; 2 ♀.)

This small, rather dark-looking, species was discovered by Stella Hudson, on Mount Arthur, at an elevation of about 4,200 feet above the sea-level.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch; of the female fully $\frac{3}{4}$ inch. The fore-wings of the male are dark purplish-slate colour, with the markings heavily sprinkled with white scales and irregularly outlined with small interrupted black marks; a broad, very irregular, transverse band from costa near base to middle of dorsum; a white sprinkled blotch near middle of costa; a large sub-terminal patch touching this; several small crescentic black marks on outer half of costa; the cilia are pale brownish-grey barred with darker grey. The hind-wings and cilia are dark brownish-grey. The female is much paler with the white sprinkling more pronounced; the sub-medial band broader, more regular and less oblique; the hind-wings are whit-

ish-grey, darker towards the apex. The cilia of the fore-wings are white, barred with grey; of the hind-wings almost white.

The perfect insect appears in January and is found on the open mountain side, just above the limit of forest growth.

CNEPHASIA HOLORPHNA.

(*Cnephasia holorphna*, Meyr., Trans. N.Z. Inst., xliii., 74.)

(Plate XXVII., fig. 4 ♂.)

This very dull-looking species was discovered on Mount Olympus near Castle Hill, West Coast Road, in 1893, but does not appear to have been found since.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the termen obliquely rounded; dull slaty-brown irregularly spotted with black, the spots tending to form wavy transverse stripes; towards the costa and termen there are numerous dull white scales clustered on the edges of the black markings. The hind-wings are dark greyish-brown, darker towards the termen.

The perfect insect was captured in January, flying over stunted alpine vegetation at an altitude of about 5,600 feet above the sea-level and was comparatively common within a restricted area. It is evidently extremely local.

CNEPHASIA PETRIAS.

(*Harmotoga petrias*, Meyr., Trans. Ent. Soc. Lond., 1901, 572.)

(Plate XXVII., fig. 5 ♂.)

This pretty variegated species has occurred on the Hunter Mountains, Longwood Range, Invercargill, and Bluff.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are dull purplish-grey; there is a broad oblique white band from $\frac{1}{4}$ of costa to middle of dorsum; a second broad somewhat angulated band beyond this; a similar terminal band, broadest below the apex; these bands are all partly edged with fine, broken blackish lines and there are scattered reddish-brown marks over the patches of dark ground colour; the white bands are also strewn with scattered grey scales; there is a minute blackish discal dot. The hind-wings are warm brown, very faintly mottled with grey.

In some specimens the dark transverse markings appear more broken than in others.

This species has a considerable superficial resemblance to *Harmotoga pontifica*, which is, however, a larger insect.

The moth appears from November till January, and is found on open country amongst *Cassinia*.

Described and figured from a specimen kindly given to me by Mr. Philpott.

CNEPHASIA IMBRIFERANA.

(*Dipterina imbriferana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 527; Trans. N.Z. Inst., xv., 55.)

(Plate XXVI., fig. 40 ♂; 41, 42 ♀ varieties; Plate III., fig. 2 larva.)

This dull-looking little species has occurred at Auckland, Ohakune, and Wellington in the North Island. In the South Island it has been taken at Takaka and Dunedin.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather narrow with the termen obliquely rounded; *pale whitish-ochreous or pale brownish-ochreous*; there is a brownish-black basal area, a broad curved central band broader on the dorsum and a more or less well-defined darker apical patch. In many specimens these bands are extremely faint, except on the costa and dorsum, and this is usually the case with those having a brownish-ochreous ground colour. The hind-wings vary from pale gray to pale greyish-ochreous.

The larva, which feeds in the dead branches of *Fuchsia excorticata*, is about three-sixteenths of an inch in length, very stout, slightly tapering posteriorly. The head is large brownish-green highly polished; the second segment has a shining brownish-green dorsal plate; the rest of the body is pale green; the prolegs are very short; there is a large blackish-green spot on the penultimate segment. It inhabits the hardest portions of the wood, generally near the junction of branches, where it is much knotted.

The pupa is enclosed in a slight cocoon usually secreted in one of the old burrows made by the larva.

The perfect insect appears from November till April, specimens emerging from the pupa as late as the second week in March. It frequents forest, or scrub, and is often met with amongst the dead fronds of tree-ferns. It rests with the wings closed flat and overlapping. The dark central patch on the dorsum of the fully exposed fore-wing combines with the visible portion of the same marking on the opposite wing and makes a dark spot in the middle of the insect. At the same time the antennae are concealed and only the tips of the intermediate tarsi visible. When thus resting the entire insect very closely resembles a small patch of ordinary grey lichen.

CNEPHASIA MICROBATHRA.

(*Cnephasia microbathra*, Meyr., Trans. N.Z. Inst., xlii., 62.)

(Plate XXVI., fig. 39 ♀.)

This distinct, though rather inconspicuous species, was discovered by Mr. Philpott at West Plains near Invercargill. It has also occurred at Otira, Dunedin, and Orepuki.

The expansion of the wings is nearly $\frac{3}{4}$ inch. The fore-wings are light brown; there is a conspicuous blackish-brown basal patch; several dots in the disc; a narrow dark brown patch on the costa near the middle, continued obliquely half-way across the wings as a faint brownish bar; three small blackish-brown spots on the costa before the apex and several on the dorsum near the tornus; there are two irregularly-curved series of fainter brown spots crossing the wing before the apex. The hind-wings are blackish-grey.

The perfect insect appears from September till February, and frequents damp forests. It is a rare species.

Described and figured from a specimen in Mr. Philpott's collection.

CNEPHASIA PATERNA.

(*Cnephasia paterna*, Philp., Trans. N.Z. Inst., lvi., 391.)

(Plate LII., fig. 26 ♂.)

This remarkable-looking species was discovered by Mr. S. Lindsay, at Little River, near Christchurch.

The expansion of the wings is nearly $\frac{3}{4}$ inch. The fore-wings, which have the costa almost straight, the apex pointed and the termen very oblique, are dull brown, very slightly purplish-tinged, with numerous blackish strigulae; there are dark margined orange spots on the costa near the base, near the middle, and immediately before the apex. The hind-wings are pale brown. The antennae are blackish broadly ringed with white with whorls of cilia at each joint.

The perfect insect appears at the end of March.

Described and figured from a specimen submitted by Mr. Philpott.

Genus 16.—OCHETARCHA, Meyr.

Palpi rather slender, curved, ascending, with appressed scales, terminal joint extremely short. Thorax with posterior crest. Fore-wings with vein 2 from before $\frac{1}{2}$, 3 from angle, 7 to termen. Hind-wings without cubital pecten; 3 and 4 connate, 5 approximated, 6 and 7 short-stalked.

Represented by a single species only.

OCHETARCHA MIRACULOSA.

(*Olinia miraculosa*, Meyr., Trans. N.Z. Inst., xlix., 246; lv., 661.)

(Plate XLV., fig. 9 ♂; Plate XXV., fig. 33 variety.)

Two specimens of this very striking insect were taken by Stella Hudson at Wainuiomata near Wellington. It has also been found in Gollan's Valley.

The expansion of the wings is slightly over 1 inch. The fore-wings are pale brownish-ochreous shaded with darker brown towards the apex and thinly covered with numerous minute brownish strigulae; there is a very large heavy deep chocolate-brown crescentic marking in the disc, the horns of the crescent, which are of unequal thickness, resting on the dorsum and its outer curved edge almost touching the costa. The hind-wings are dark greyish-brown, becoming pale ochreous-brown on the costa near the base.

This species may be variable as another somewhat similar form, with two thick brown bars on the dorsum in place of the crescentic mark, was taken on the Waitakere Ranges near Auckland. (Plate XXV., fig. 33.)

The perfect insect appears late in December, and frequents scrubby forest. It is thus referred to by Mr. Meyrick: "This is a most surprising species, its strikingly conspicuous markings being unlike anything else, whilst its generic affinity is equally unexpected. I think, however, that it may possibly prove identical with the species figured by Felder (without description) as *Paedisca mahiana* (Reis. Nov. pl. cxxxvii., 40) from New Zealand, and not otherwise known to me, which has a somewhat similar scheme of marking, but totally different and in fact reversed colouring, the dark fascia being represented by a pale area and the enclosed semicircular dorsal blotch dark instead of light. Such an excessive range of variation cannot be assumed without evidence, and therefore I have been constrained to treat the species as new. Felder's generic attribution is of no scientific authority, and the colouring of his figure recalls some South American insects, whilst his localities are sometimes erroneous. Special effort should be made to find further examples of this curious insect, which may be very local."

Sub-family 3.—EUCOSMIDES.

Ocelli present. Fore-wings with vein 2 from before $\frac{1}{2}$ of lower margin of cell. Hind-wings with cubital pecten, 5 present. (Plate F., figs. 10-18 and 22-24.)

This family is very scantily represented in New Zealand, though very numerous throughout the Northern Hemisphere. (Meyrick.)

The following seven genera are represented in New Zealand:—

- | | |
|---------------------|-------------------|
| (1.) HENDECASTICHA. | (4.) CROCIDOSEMA. |
| (2.) SPILONOTA. | (5.) BACTRA. |
| (3.) EUCOSMA. | (6.) LASPEYRESIA. |
| (7.) ARGYROPOLOCE. | |

Genus 1.—HENDECASTICHA, Meyr.

Antennae in male eiliated, with an excavated notch in stalk towards base. Palpi moderate, porrected, second joint with dense rough projecting hairs above and beneath, terminal short. Thorax without crest. Fore-wings with vein 7 absent, 8 to costa. Hind-wings with vein 4 absent, 5 somewhat approximated towards 3 at base, 6 and 7 stalked.

Contains only the single species; a local modification of *Spilonota*.

HENDECASTICHA AETHALIANA.

(*Hendecasticha aethaliana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 692; Trans. N.Z. Inst., xv., 64.)

(Plate XLV., fig. 31 ♂.)

This sturdy-looking little species was discovered by Mr. Meyrick at Hamilton in January, 1880. Apparently it has not been found by subsequent collectors.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate-oblong with the costa almost straight and the termen oblique; dark brown; there are two diffused patches of pale brown, a large one on the dorsum near the middle and a much smaller one near the middle of the termen; the basal and median areas are heavily sprinkled with whitish scales and there are two faint curved bluish-white sub-terminal bands. The hind-wings, which have the apex round pointed, are dark brown.

The perfect insect was found amongst rough herbage near a swamp, where it was rather common.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

Genus 2.—SPILONOTA, Steph.

Antennae in male ciliated, with an excavated notch in stalk towards base. Palpi moderate, porrected, second joint with dense rough projecting scales above and beneath, sometimes tufted beneath, terminal short. Thorax without crest. Fore-wings with vein 7 separate, to termen. Hind-wings with veins 3 and 4 long-stalked or coincident,* 5 closely approximated to 4 at base, 6 and 7 approximated towards base. (Plate F., figs. 10, 11 neuration of *Spilonota chaophila*; fig. 12 head of ditto.)

A genus of moderate extent and wide distribution, but principally Australian; two of the New Zealand species occur also in Australia.

*Veins 3 and 4 of the hind-wings are distinctly separate in *Spilonota chaophila*.

Represented in New Zealand by eight species, two confined to the North Island, one to the South Island, and five common to both islands.

SPILONOTA CHAROPA.

(*Strepsicrates charopa*, Meyr., Trans. N.Z. Inst., xx., 73.)

This species has occurred at Whangarei and at Auckland.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate, narrow, pale ochreous somewhat suffused with deeper ochreous; a few fine scattered dark fuscous scales; a short leaden-metallic erect streak from tornus and a similar one before middle of termen; cilia light ochreous with an ill-defined blackish apical spot. Hind-wings grey, apex tinged with whitish-ochreous; cilia grey-whitish with a cloudy darker line.

The perfect insect appears in December.

I am unacquainted with this species. The above is abridged from the original description.

SPILONOTA DOLOPAEA.

(*Strepsicrates dolopaea*, Meyr., Trans. Ent. Soc. Lond., 1905, 232.)

(Plate XXVII., fig. 25 ♂; Plate XLVII., fig. 5 ♀.)

At present this species has only been recorded from Wellington and Christchurch.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate, rather narrow with the termen oblique, slightly curved and rounded beneath; dull white in the male, more or less speckled with coppery-brown; a large patch of coppery-brown on the costa reaching the apex and extending along the termen almost to the tornus; an obscure oblique lead-coloured mark from the costa just before the apex to the middle of the termen and another duller mark inside this. The hind-wings are pale grey, becoming brownish towards the tips; the cilia of all the wings are whitish grey. The male has a long expansible blackish hair pencil from base lying in a dorsal fold of the hind-wings. In the female the fore-wings are much clouded and mottled with chocolate-brown; there is a number of oblique stripes on the costa and dark patches before and beyond the disc; the dull lead-coloured marks are larger and more conspicuous than in the male. The hind-wings are almost white.

Apparently both sexes vary considerably in the depth and extent of the dark markings on the fore-wings.

The perfect insect appears in October and November and is found in glades amongst forest or scrub. It seems to be a rare species.

SPILONOTA PARTHENIA.

(*Strepsicrates parthenia*, Meyr., Trans. N.Z. Inst., xx., 73.)

(Plate XXVII., fig. 26 ♀.)

This very distinctly-marked species has occurred in the Waitakere Ranges near Auckland, and at Gollan's Valley and other localities, near Wellington.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate, with the apex pointed, and the termen obliquely rounded; a broad white longitudinal band along costa; a deep chocolate-brown, or blackish, band below this, extending from about $\frac{1}{3}$ to apex; in the female $\frac{2}{3}$ of the entire wing towards dorsum is clouded with pale brown, but in the male this area is white, usually with several large blackish blotches and striae;

about eight fine blackish bars are situated on the outer part of the costa; there is a faint leaden-metallic streak from the tornus, and another from about the middle of the termen; the cilia are pale brownish-ochreous, with a black apical spot. The hind-wings and cilia are white.

Variable in the extent and intensity of the dark markings, especially in the male.

The perfect insect appears from about the last week in August until the middle or end of September. It is thus one of the earliest of our Lepidoptera to emerge in the spring, and at this season it may be often found, fairly plentifully, amongst *Leucopogon fasciculatus* upon which its larva probably feeds. This species is an excellent illustration of the need for the collector to be on the alert at unlikely times of year and in unlikely places. For over thirty years I had but a single specimen of *S. parthenia* in my collection, owing to the fact that I consistently failed to look for the insect, either at the right season, or in the proper place.

SPILONOTA ZOPHERANA.

(*Strepsicerus zopherana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 688; Trans. N.Z. Inst., xv., 64; *Strepsicerates zopherana*, Meyr., Trans. N.Z. Inst., xx., 73.)

(Plate XXVII, fig. 29 ♂.)

Generally distributed throughout New Zealand wherever Manuka is abundant.

The expansion of the wings is from $\frac{3}{4}$ to seven-sixteenths of an inch. The fore-wings are narrow with the apex pointed and the termen obliquely-rounded; pale greyish-brown with an interrupted cloudy white streak from base to apex; there is a series of fine oblique brown lines on the costa except near the base; a conspicuous blackish-brown bar in the disc; two much smaller bars beyond this; the cilia are blackish-grey, paler towards the tornus with a conspicuous black patch at the apex. The hind-wings, which have the apex pointed, are pale brown, darker towards the apex and termen.

This species is rather variable in the depth of the greyish-brown colouring, the width of the white streak, and the extent and intensity of the other markings.

The perfect insect appears from August to October, and again from January to March, the specimens taken at these times apparently belonging to two different broods. It is found amongst manuka scrub (*Leptospermum scoparium*), and in such localities it is often locally abundant. The larva probably feeds on the manuka.

This species is also found in Australia.

SPILONOTA EMPLASTA.

(*Strepsicerates emplasta*, Meyr., Trans. Ent. Soc. London, 1901, 571.)

(Plate XXVII, fig. 27 ♂.)

This species was discovered by Mr. Philpott at West Plains near Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate, narrow, with the termen very oblique and the tornus rounded; shining white with coppery-brown markings; there are a number of irregular stripes on the costa, scarcely reaching half-

way across the wing; an irregular patch of coppery-brown on the dorsum at the base extending to about $\frac{1}{3}$; a second broken irregular patch in the middle of the wing almost touching the first; a triangular black marked spot near the tornus reaching half-way across the wing; a longitudinal dark brown dash towards the costa before the apex; a dark brown streak along the termen; the cilia are grey mixed with brown and white. The hind-wings are grey with the cilia pale grey; veins 3 and 4 are coincident.

This species is stated to be distinguished from *Spilonota zopherana* by its larger size by the clear, white ground colour of the fore-wings, and by the small dark stripes on the same which are irregularly oblique in *emplasta* and acutely angulated in *zopherana*.

The perfect insect appears in October.

SPILONOTA CHAOPHILA.

(*Strepsicerates chaophila*, Meyr., Trans. N.Z. Inst., xli., 10.)

(Plate XXVI, fig. 35 ♂; 36 ♀.)

At present this species has only been found in the neighbourhood of Wellington, and at Takaka.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rather elongate with the apex blunt and the termen slightly curved and oblique; bright brownish-ochreous; there is a large blackish-brown basal patch, very pointed towards the termen; four dots on the costa before the apex; a triangular tornal patch; an obscure oval leaden metallic marking near the termen forming the margin of an ocellus, the upper margin being also bounded by a rather large, blackish-brown spot above the middle of the wing; in the female the fore-wings are reddish-brown with the principal markings indistinct or absent; the cilia are brown becoming black towards the apex. The hind-wings and cilia are brownish-grey.

There is great variation in the intensity of the markings, and the fore-wings in the male are often much suffused with brownish-black.

The perfect insect appears in October and frequents forest, but is usually very local.

SPILONOTA EJECTANA.

(*Sciaphila ejectana*, Walk., Cat. xxviii., 350; *Strepsicerus ejectana*, Meyr., Proc. Linn. Soc. N.S.W., 1881, 681; Trans. N.Z. Inst., xv., 63; *Sciaphila servilisana*, Walk., Cat., xxviii., 356; *Sciaphila saana*, ib., 357; *Conchylis ligniferana*, ib., 363; *Strepsicerates ejectana*, Meyr., Trans. N.Z. Inst., xx., 73.)

(Plate XXVII, figs. 1, 2 varieties.)

This species is common and generally distributed throughout the country.

The expansion of the wings varies from slightly under to slightly over $\frac{1}{2}$ inch. The antennae of the male are notched at about $\frac{1}{3}$ from the basal joint. The fore-wings are light grey, more or less speckled with dull white and darker grey; there are several blackish streaks on the costa; the male has a tuft of raised scales on the sub-median fold before the middle; there is usually a cloudy, longitudinal, blackish streak near the middle; often a number of small ochreous-brown patches irregularly dispersed on the wing; an ill-defined, often very indistinct, brownish patch on the termen below the apex. The hind-wings are brownish-grey and the cilia of all the wings grey; veins 3 and 4 of the hind wings are long-stalked.

This species is very variable both in colour and markings but may be distinguished from the other allied species by its broader wings and by the other structural differences specially mentioned above.

According to Mr. Meyrick the larva is active, cylindrical; dull green, more yellowish-tinged on the sides and towards the extremities, the spots are paler; the head black; the second segment, or posterior half only, black. It feeds in September in spun-together shoots or in a loose tubular web, amongst the leaves of *Leptospermum scoparium*; in Australia on other *Myrtaceae*.*

The perfect insect appears from December to March and frequents manuka scrub. It seems to be rather local.

SPILONOTA MACROPETANA.

(*Spilonota macropetana*, Meyr., Proc. Linn. Soc. N.S. Wales, vi., 683, 1881.)

(Plate XLIX., fig. 8 ♂.)

This very distinctly-marked species has occurred amongst *Eucalyptus* at Auckland, at Havelock North and Nelson.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are chocolate-brown finely streaked with blackish-grey, especially along the veins and costa; there is a broad wavy longitudinal whitish band along the dorsum, edged with blackish along its basal third; a whitish discal spot and several minute black streaks near the tornus; the cilia are blackish-grey. The hind-wings are dark greyish-ochreous.

Of this insect Mr. Meyrick says: "The species is a native of Australia, where it is common and widely distributed, and has doubtless been artificially introduced with *Eucalyptus*, which is its foodplant.†

Described and figured from a specimen submitted by the Department of Agriculture.

Genus 3.—EUCOSMA, Hübn.

Antennae in male ciliated. Palpi moderate, porrected, second joint with dense rough projecting scales above and beneath, terminal short. Thorax without crest. Fore-wings with vein 7 separate, to termen. Hind-wings with veins 3 and 4 usually stalked, sometimes connate or coincident, 5 approximated to 4 at base, 6 and 7 approximated towards base. (Plate F., figs. 13, 14 neuration of *Eucosma querula*; fig. 18 head of ditto.)

A very extensive genus, but principally characteristic of the Northern Hemisphere.

We have four species in New Zealand.

EUCOSMA MOCHLOPHORANA.

(*Exoria mochlophorana*, Meyr., Trans. N.Z. Inst., xv., 65.)

This species was discovered by Dr. W. H. Gaze at South Rakaia.

The expansion of the wings of the male is slightly under $\frac{1}{2}$ inch. The fore-wings are very narrow, with the termen extremely oblique; pale greyish-ochreous, obscurely strigulated with grey, and with scattered dark fuscous scales; base mixed

with dark fuscous; two small dark fuscous spots on costa near base; a moderately broad, slightly curved dark fuscous fascia from $\frac{1}{3}$ of costa to two-fifths of dorsum; a small dark fuscous spot on middle of costa; a dark fuscous fascia from $\frac{2}{3}$ of costa to tornus, upper half narrow, lower half very broadly dilated; a narrow somewhat irregular dark fuscous fascia from five-sixths of costa to middle of termen; a small dark fuscous apical spot; cilia ochreous-whitish mixed with grey. Hind-wings rather dark grey; cilia grey, tips paler.

A very distinct species, in form and marking somewhat resembling *Eurythecta robusta*.

The perfect insect was taken in March frequenting rough herbage.

I am unacquainted with this species. The above is taken from the original description.

EUCOSMA APHRIAS.

(*Epiblema aphrias*, Meyr., Trans. Ent. Soc. Lond., 1901, 578.)

Two specimens of this species were taken by Mr. Meyrick at Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are whitish, with a few scattered grey strigulae; basal area more mixed with grey, limited by a rather broad ochreous-grey fascia reaching from dorsum $\frac{1}{2}$ across wing, its lower half blackish; central fascia moderate, ochreous-grey, with several small spots of black scales, bifurcate on costa, dilated on tornus; a small ochreous-grey spot on costa towards apex, and a patch on upper half of termen, sometimes confluent; cilia grey, tips whitish. Hind-wings dark grey, lighter towards base; cilia grey; 3 and 4 coincident.

The perfect insect appears in December.

I am unacquainted with this species. The above is taken from the original description.

EUCOSMA FUGITIVANA.

(*Protithona fugitivana*, Meyr., Trans. N.Z. Inst., xv., 62.)

A single specimen of this species was taken at Lake Coleridge.

The expansion of the wings of the male is about $\frac{1}{2}$ inch. The fore-wings are narrow with the termen obliquely rounded; light greyish-ochreous; a suffused elongate blackish patch in disc above middle; an inwardly oblique suffused blackish mark on dorsum before middle, before which the ground colour is somewhat mixed with blackish; an outwardly oblique broad blackish spot from dorsum before tornus extending suffusedly to apex; the space between these three blackish marks is ochreous-whitish; three small suffused dark fuscous spots on costa towards apex; cilia ochreous-whitish, fuscous towards base. Hind-wing fuscous-grey.

One of the smallest and most insignificant-looking of the *Tortricidae*.

The perfect insect appears in March.

I am unacquainted with this insect. The above is taken from the original description.

EUCOSMA QUERULA.

(*Eucosma querula*, Meyr., Trans. N.Z. Inst., xlv., 125.)

(Plate XXV., fig. 36 ♂; 37 ♀.)

This interesting species has occurred at Kaeo, north of Auckland, Auckland, Wellington, and at Christchurch.

*Trans. N.Z. Inst., xv., 63.

†Trans. N.Z. Inst., liv., 164.

It was first observed in 1901 and has certainly become much more plentiful in recent years than formerly.

The expansion of the wings of the male is slightly under 1 inch; of the female fully 1 inch. The fore-wings of the male are elongate-triangular with the costa moderately arched, the termen slightly oblique and the basal fold very short and narrow; dark greyish-brown with very strong bronzy-purple reflections; there is a pale golden-brown band beneath the fold; one or two cloudy black marks on the fold; a small black discal dot with a pale golden brown centre; a number of small blackish costal marks and an irregular series of blackish sub-terminal spots; all the black markings are margined with a golden brown shading. The hind-wings are pale bronzy-brown. The female has the wings slightly narrower than the male, very deep purplish-brown with golden reflections; there is no pale band on the fold but a white-centred bronzy-black discal dot and several series of elongate sub-terminal spots. The hind-wings are pale bronzy-grey.

The perfect insect appears in November, February, March and April. It is more often found in houses, or at rest on fences in towns, than in the native forest, and hence may have semi-domestic habits. Mr. Meyrick states:—"I have two female specimens from Queensland which I refer with little doubt to this species; I suppose it to be indigenous in Australia (and very likely in some of the Malayan Islands), and to have been recently introduced into New Zealand. It belongs to a group of several Indian and Malayan species, which are almost exactly alike in superficial appearance, but possess good characters for discrimination in the secondary sexual structures of the male—viz., the costal fold of the fore-wings, the folding and tufting of the dorsal margin of hind-wings, and the presence of hairy tufts on the abdomen."

Genus 4.—CROCIDOSEMA, Zell.

Differs from *Eucosma* in the possession in the male of an erect brush tuft of scales on the base of lower margin of cell (cubital vein) in hind-wings.

A South American genus, represented by one species conveyed everywhere with garden plants.

CROCIDOSEMA PLEBEIANA.

(*Eucosma plebeiana*, Zell. Isis. 10, 721 (1847); Philp., Trans. N.Z. Inst., liv., 151.)

(Plate XLIX., fig. 10 ♂.)

Specimens of this widely distributed species have been taken by Mr. Philpott at Nelson, who reports that it is now abundant in that locality.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are brownish-ochreous with a broad irregular oblique brownish-white median band connected with a very large oval patch above the tornus; the basal area is covered with scattered brown spots; there are numerous very fine darker costal strigulae; two minute pale marks before apex; two leaden metallic marks in the tornal patch as well as two minute horizontal black marks. The hind-wings are pale ochreous-brown with a large tuft of long hair at the base of each.

The larva feeds on mallows.

The perfect insect appears from December till May.

Described and figured from a specimen kindly given to me by Mr. Philpott.

Genus 5.—BACTRA, Steph.

Antennae in male ciliated. Palpi moderate or long, porrected, second joint with projecting scales above and beneath, terminal short. Thorax without crest. Fore-wings with vein 7 separate, to termen. Hind-wings with veins 3, 4, 5 closely approximated at base, 6 and 7 stalked. (Plate F., figs. 16, 17 neuration of *Bactra noteraula*; fig. 18 head of ditto.)

A rather considerable genus of wide distribution, of which the species are very similar and puzzling, and have been involved in much confusion. Some of the species, and very possibly all, are attached to various species of *Juncus*. There is often much variability, but the length of the palpi, form of fore-wings, and colour of hind-wings are important and reliable characters. There are four New Zealand species.

BACTRA NOTERAULA.

(*Bactra noteraula*, Wism. Faun. Haw., i., 689; *Chiloides straminea*, Meyr. (nec. Butl.) Trans. N.Z. Inst., xvii., 142; *Noteraula straminea*, Meyr. ib. xxiv., 217.)

(Plate XXVI., fig. 9 ♂.)

This species has occurred at Kaeo, north of Auckland, Hamilton, Taupo, Taranaki, Wanganui, Otaki and Wairarapa. It is probably generally distributed throughout the North Island. In the South Island it has occurred at Dunedin.

The expansion of the wings varies from slightly under to slightly over $\frac{1}{2}$ inch. The fore-wings are elongate, oblong, with the costa slightly arched, the apex pointed and the termen oblique; light ochreous with all the veins marked with fine black or brownish lines, the spaces between being also marked with dotted brownish lines; there is a larger dark brown dot beyond the middle and a series of blackish-brown dots on the dorsum; the cilia are pale ochreous. The hind-wings are grey with the cilia white.

The perfect insect appears from January to March. It is stated to be common amongst rushes (*Juncus*) in swampy ground, but seems to be somewhat local.

This species was originally wrongly identified as *Chiloides straminea*, Butl. The last-named insect has since proved to be only a form of the wide-spread *Bactra lanceolana*, Hübn. It has therefore no connection with the species here described.

BACTRA OPTANIAS.

(*Bactra optanias*, Meyr., Trans. N.Z. Inst., xliii., 89.)

(Plate XLV., fig. 30 ♀.)

This species was discovered by Mr. Meyrick at Hamilton.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather elongate with the termen oblique; pale ochreous clouded with grey along the dorsum and below the apex; there are many very fine black strigulae on the costa and a number of short thick black marks on the terminal area; a bright ochreous patch is situated near the tornus containing several thick black marks; the cilia are greyish-ochreous. The hind-wings are pale ochreous, narrowly clouded with brownish-grey towards the margins.

This species is rather variable. In some specimens the fore-wings are much clouded with rusty-red, or brownish. In others there are leaden-metallic marks between the strigulae near the apex.

The perfect insect appears in January.

This species is widely distributed in Australia.

BACTRA SIDERITIS.

(*Noteraula sideritis*, Meyr., Trans. Ent. Soc. Lond., 1905, 232.)

The single specimen from which this species was described is believed to have been taken at Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate, somewhat dilated posteriorly, costa moderately arched, apex obtuse, termen slightly sinuate, rather oblique, rounded beneath; whitish-ochreous finely strigulated with dark fuscous, mixed in disc and towards apex wholly suffused with ferruginous-ochreous; two curved posterior oblique purplish-lead-metallic striae from costa at $\frac{1}{4}$ and $\frac{1}{2}$, terminating before and beyond tornus; a series of undefined blackish marks between these, starting from an oblique lead-metallic costal streak; a short direct lead-metallic costal streak before apex; cilia grey, basal third with a blackish-grey line broadly interrupted with brownish-ochreous, at tornus whitish-ochreous. Hind-wings grey, terminal edge whitish; cilia light grey, with darker basal line.

In this species the palpi are much shorter and the termen of fore-wings much less oblique than in *Bactra noteraula*.

I am unacquainted with this insect. The above is abridged from the original description.

BACTRA XYSTROTA.

(*Bactra xystrota*, Meyr., Trans. N.Z. Inst., xliii., 62.)

(Plate XXVI., fig. 18 ♀.)

This distinctly-marked species was discovered at New River, near Invercargill, by Mr. Philpott. It has also occurred at Owenga in the Chatham Islands.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings, which have the apex acute and the termen obliquely rounded, are pale brownish-ochreous faintly clouded with grey in the disc; the veins are clearly marked in blackish-grey and there are a few faint greyish dots on the spaces between the veins. The hind-wings are dark grey with the cilia ochreous.

The perfect insect appears in January, and frequents sandhills on the sea-coast.

Described and figured from a specimen in Mr. Philpott's collection.

Genus 6.—*LASPEYRESIA*, Hübn.

Antennae in male ciliated. Palpi moderate, more or less ascending second joint arched, with short projecting scales beneath, terminal joint short. Thorax without crest. Fore-wings with vein 7 separate, to termen. Hind-wings with veins 3 and 4 connate or stalked, 5 nearly parallel to 4, 6 and 7 approximated towards base. (Plate F., figs. 22, 23 neuration of *Laspeyresia pomonella*; fig. 24, head of ditto.)

A considerable genus generally distributed, but only represented in New Zealand by a single introduced species.

LASPEYRESIA POMONELLA.

(*Carpocapsa pomonella*, Linn. Syst. Nat. x., 538; Meyr. Proc. Linn. Soc. N.S.W. 1881, 657; Trans. N.Z. Inst. xv., 61.)

(Plate XXV., fig. 38.)

This handsome, though destructive little insect, is common in most New Zealand orchards north of the lower end of Lake Wakatipu.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are pale grey with numerous rather wavy darker grey transverse lines; there is a large dark brown patch on the termen containing a conspicuous oval ring-shaped coppery mark and edged with black towards the tornus. The hind-wings are brownish-grey, darker on the termen.

There is considerable variation in size but the colouring is very constant.

The larva is pale pink with the head scarcely darker; the second segment is pale yellowish-brown; it feeds inside apples and pears, forming galleries in the substance of the fruit, in which it deposits its dark brown excrement; when full fed it quits the fruit. The pupa is enclosed in a silken cocoon, usually attached to the trunk of an apple tree.

The perfect insect appears from December till March, and is often very common in orchards, not infrequently entering houses. Owing to its extremely destructive habits it is a most notable insect, being popularly termed the Codlin Moth. It has received much attention from economic entomologists and a great deal has been written regarding its habits and the best means of combatting its ravages. It was no doubt accidentally introduced into New Zealand many years ago, but is now very firmly established. It also appears to occur in most other countries where apples and pears are cultivated.

Genus 7.—*ARGYROPOLOCE*, Hübn.

Palpi moderate, porrected or ascending, second joint rough-scaled. Thorax with posterior crest. Fore-wings without costal fold, vein 7 separate to termen. Hind-wings with veins 3 and 4 connate or stalked, 5 approximated, 6 and 7 closely approximated towards base. Posterior tibiae often tufted with scales.

Represented in New Zealand by a single species.

ARGYROPOLOCE CHLOROSARIS.

(*Argyroplote chlorosaris*, Meyr., Trans. N.Z. Inst., xli., 106.)

(Plate XXVI., fig. 26 ♂.)

This pretty little species appears to be very rare. It has occurred on the hills near Day's Bay, Wellington Harbour, Orongorongo, and at Plimmerton.

The expansion of the wings is considerably over $\frac{1}{2}$ inch. The fore-wings are rather broad with the termen oblique; pale purplish-brown irregularly spotted with darker brown; there is a very large cream-coloured costal patch just beyond the base prolonged as a narrow stripe almost to the apex; there are also several faint cream-coloured marks on the dorsum and a reddish-brown spot at apex. The hind-wings are brown.

Apparently variable in the extent of the cream-coloured markings.

The perfect insect appears early in December and is found in dry forest on hill sides.

CHAPTER XVI.

THE AEGERIADAE.

The family *Aegeriadae** is distinguished by the following characters:—

The head is clothed with appressed scales; the antennae are dilated on the apical half; the labial palpi are moderately long, curved, ascending with the terminal joint short and pointed; the maxillary palpi are rudimentary. The fore-wings have veins 7 and 8 stalked; the hind-wings are elongate ovate with vein 5 absent, veins 6 and 7 nearly parallel and 8 concealed in the rolled costa.

The larvae are elongate, with ten pro-legs, feeding in the wood of trees, or the rootstocks of plants. The pupae have abdominal whorls of spines; segments 8-11 are free, in male segment 12 also. The pupa state is spent within the larval gallery.

Superficially the members of this family may be at once recognised by the major portion of both pairs of wings being devoid of scales and transparent, and for this reason they are often known by the very appropriate name of "Clearwings." The family does not properly belong to the New Zealand fauna, its sole representative in this country having been introduced from Europe with the garden currant. The group is chiefly characteristic of the Northern Hemisphere, over one hundred species being known from the Palaearctic Region and fourteen species from the British Islands. Some of the species have a very strong superficial resemblance to stinging insects, such as wasps and hornets, and these cases are undoubtedly instances of protective mimicry, but in many others the supposed resemblances which have been traced to ichneumon flies and various Diptera are, to a great extent, accidental and have no real significance. The family is intimately related to the *Tineidae*, a connecting group, the *Tinaegeriadae*, occurring in tropical Africa and elsewhere.

Genus 1.—TROCHILIMUM, Scop.

Head with appressed scales. Tongue developed. Antennae $\frac{4}{5}$, in male sometimes sub-dentate, ciliated. Labial palpi with second joint thickened with rough scales beneath, terminal loosely scaled. Abdomen with large flattened expansible anal tuft. Fore-wings with 7 to apex. Hind-wings with 3 and 4 stalked.

There is one species in New Zealand.

TROCHILIMUM TIPULIFORME.

(*Trochilimum tipuliforme*, Clerck, Icon. pl. ix., 1; *Sesia tipuliformis*, Meyr., Trans. N.Z. Inst., xxii., 214.)

(Plate XXXIII., fig. 6 ♂.)

This interesting insect, originally introduced from Europe amongst currant-bushes, is now well established throughout New Zealand, though nowhere very common.

The expansion of the wings is about $\frac{1}{2}$ inch. The antennae are gradually thickened towards the apex with the extreme tip abruptly pointed and slightly bent. The fore-wings are transparent with the margins and central spot black tinged with orange; the termen is distinctly tinged with orange. The hind-wings are transparent with the margins narrowly black tinged with orange, the cilia rather paler. The head is black; the thorax also black with a slender yellowish streak on each side; the abdomen is black with three yellowish rings, the anal tuft is entirely black.

The larva is whitish with a darker dorsal line; the head is pale brown, the hinder part of the head showing through the second segment; on the upper surface of the second segment, behind the lobe of the head, are two linear brown spots; it feeds from autumn to spring on the pith of currant-bushes, which hence assume a sickly appearance, and are sometimes killed by the attacks of these larvae.

The perfect insect appears in December and January, and may be noticed sitting on the leaves of currant-bushes, or on flowers in their neighbourhood; though a sleepy-looking insect, it requires to be approached with caution, and the net should be used to effect its capture.

*This family is often called the *Sesiidae*.

CHAPTER XVII.

THE TINEIDAE.

The *Tineidae* are distinguished by the following characters:—

The head is clothed with appressed scales or rough-haired. The antennae are usually $\frac{1}{2}$ the length of the fore-wings or more. The maxillary palpi are often developed. The labial palpi have the terminal joint more or less pointed. The tibiae have all the spurs present and usually long. The fore-wings have vein 1b normally furcate, 1c more or less developed, 5 normally not more approximated to 4 than to 6, neuration sometimes much degraded. The hind-wings are furnished with a frenulum, vein 1c present, though doubtful in forms with degraded neuration, 8 sometimes connected with middle of the upper margin of cell, thence diverging, seldom absent, neuration sometimes much degraded. (Plates F, figs. 25-36, G, H. and K.)

In certain sub-families (especially the *Tineides*) there is a remarkable tendency to the degradation of the wing structure, the wings becoming very narrow (compensation being afforded by a great increase in the length of the cilia), and many of the veins disappearing by coincidence. Notwithstanding the great difference in structure between the extreme forms, the whole are so closely connected by intermediate gradations that the clear definition of sub-families is by no means easy. The imago has the fore-wings more or less elongate, varying from oblong to linear; the hind-wings varying from ovate to linear. The typical markings of the fore-wings consist of three small dark spots or dots (*stigmata*), two being in the disc before and beyond the middle respectively (*first* and *second discal*), and one on the fold before the middle (*plical*); the hind-wings are without markings. The egg is usually round or oval, smooth but comparatively little known. The larva more or less elongate, with few hairs, usually living concealed, but very varied in habit. The pupa has a variable number of free segments; and, in the more primitive forms, is protruded from the cocoon in emergence, but not in higher forms.

The *Tineidae* usually constitute more than a third of the whole Lepidoptera of any given region, and this proportion is apparently maintained in New Zealand. Of the 452 species of the family, 164 belong to the *Oecophorides*, or about 36 per cent.; only in Australia does a similar proportion prevail, the usual ratio being about 9 per cent. It is curious that in the Hawaiian Islands, which have some faunal analogy with New Zealand (e.g., the great preponderance of the genus *Scoparia* in both), the *Oecophorides* are entirely absent. It is remarkable also that whilst New Zealand agrees with Australia in the numerical prevalence of the *Oecophorides*, there is little near relationship

between the representatives of the two regions, the chief Australian genera (such as *Philobota* and *Eulechria*) being only represented in New Zealand by one or two casual stragglers; the only genus well established in both regions, *Borkhausenia*, is cosmopolitan.

Other marked features are the scanty representation of the usually preponderating sub-family *Gelechiades*, the considerable development of the *Glyphipterygides* (especially *Glyphipteryx* itself), and the absence of the *Adelides*, which is an ancient sub-family and present in all other continental regions, (for I consider New Zealand as a continent, or rather the remains of one). These features are difficult to explain on any theory, and at present too little is known of the *Tineidae* of the southern parts of South America to estimate accurately the amount of relationship with that region. Certain *Glyphipterygid* genera (*Heliosibes*, and allies) are undoubtedly of South American origin; so also is the *Gelechiad* genus *Anisoptaca*. The genera of *Heliodinides* are all evidently connected with Queensland; the *Cosmopterygides*, *Graciliariades*, and *Lyonetiades* seem also all to have come from the same region.

On a general consideration of the facts it seems that the native fauna is composed of three elements introduced at different periods of time—viz. (1) a South American element, which is the oldest, yet of a geological age not very remote, perhaps the Eocene, previous to which the region was entirely devoid of insects or flowering-plants; to this belong all the larger genera, *Borkhausenia*, *Gymnobathra*, *Trachypepla*, *Izatha*, *Simaethis*, *Glyphipteryx* (in part), and a very few of the smaller genera, this fauna having been of a very limited character, and further restricted by the nature of the Antarctic lands through which the transmission was effected; (2) a mingled Australian and Indo-Malayan element derived from Queensland and the South Pacific by way of New Caledonia at a later period, conjecturally the Miocene, and including most of the smaller genera; at the same time a slight cross-immigration of the earlier element into Queensland took place (*Trachypepla*): (3) a small Tasmanian element, which has made its way (wind-borne) into New Zealand in quite recent times, the species being identical and unmodified (e.g., *Cateristis*). A fourth element of artificially introduced species is now being superadded. (Meyrick).

The numerous and varied assemblage of insects comprised in this very extensive family are, in their ornamentation

tation, structure, habits and metamorphoses, probably the most interesting section of the Lepidoptera. In some of the species, which have diurnal habits, the colouring is as gorgeous as that of tropical butterflies, whilst many of the nocturnal or crepuscular species are extremely beautiful in their wing patterns. The elongate antennae, legs and cilia of so many of the species, often variously coloured, also add a singular grace to these attractive little insects.

Notwithstanding their manifold charms these "Humming Birds" of the Lepidoptera have received but scant attention from many naturalists, but it is hoped that the enlarged coloured figures, descriptions, and life-histories here given will show that these little insects are really more attractive objects for study than many of their larger relatives.

The *Tineidae* are represented in New Zealand by the sixteen following sub-families:—

- | | |
|---------------------|---------------------|
| 1. GELECHIASES | 9. ELACHISTIDES |
| 2. DIPLOSARIDES | 10. SCYTHRIDES |
| 3. OECOPHORIDES | 11. HYPONOMEUTIDES. |
| 4. XYLORYCTIDES | 12. GRACILARIASES |
| 5. COPROMORPHIDES | 13. PLUTELLIDES |
| 6. HELIODINIDES | 14. LYONETIASES |
| 7. COSMOPTERYGIDES | 15. TINEIDES |
| 8. GLYPHIPTERYGIDES | 16. NEPTICULIDES. |

Sub-family 1.—GELECHIASES.

Head with appressed scales. Labial palpi long, recurved, pointed, usually acute. Maxillary palpi very short, appressed. Fore-wings with 2 usually from near angle, 7 and 8 stalked, 7 to costa. Hind-wings more or less trapezoidal, termen sinuate or emarginate; 6 and 7 usually approximated or stalked. (Plate F., figs. 25-30.)

An immense sub-family, abundant in all the main regions, but less prominent in Australia, and only scantily represented in New Zealand. The species are often inconspicuous and of retired habits, but are undoubtedly really scarce here.

Ten genera occur in New Zealand.

- | | |
|------------------|-----------------|
| 1. APATETRIS | 6. THIOTRICHA |
| 2. MEGACRASPEDUS | 7. PHTHORIMAEAE |
| 3. ARISTOTELIA | 8. GELECHIA |
| 4. EPITHECTIS | 9. ANISOPLACA |
| 5. STOMOPTERYX | 10. SITOTROGA. |

Genus 1.—APATETRIS, Staud.

Basal joint of antennae with pecten. Labial palpi with scales of second joint rough beneath towards apex, terminal joint much shorter, roughened anteriorly. Hind-wings under 1, termen abruptly emarginate beneath acutely produced apex; 3 and 4 rather approximated, 5 nearly parallel, 6 and 7 rather approximated towards base.

A genus of some extent in Australia, and occurring also in the Indian and African regions, but easily overlooked.

Represented in New Zealand by one species.

APATETRIS MELANOMBRA.

(*Epiphthora melanombra*, Meyr., Trans. N.Z. Inst., xx. 77; *Gelechia sparsa*, Philp., Trans. N.Z. Inst., I, 128.)

(Plate XXXVIII., fig. 3 ♂.)

This very distinct species was discovered by Fereday at Christchurch, who bred specimens from mined leaves of *Olearia avicenniaefolia*. It is probably common and generally distributed throughout the country.

The expansion of the wings is about $\frac{1}{2}$ inch. The forewings, head and thorax are pale whitish-grey, very densely sprinkled with black scales; there is a large oblique black suffusion on the dorsum near the middle, another, much smaller, before the tornus, and a very indistinct darker blotch in disc before apex. The hind-wings, which have the apex very abruptly produced, are blackish-grey.

Varies in depth of blackish suffusion and intensity of markings. A much paler form occurs in Dunedin, which was described by Mr. Philpott as *Gelechia sparsa*.

The life history has been very fully worked out by Mr. Morris N. Watt, from whose account the following particulars have been extracted.*

The egg is flat, elongate oval, without sculpture, pale yellow in colour. It is laid singly and firmly attached to upper surface of leaf. The foodplants are various species of *Olearia* and *Celmisia*.

The larva is about $\frac{1}{2}$ inch in length, cylindrical, slightly flattened, abdominal segments gradually tapering; the head is blackish, the prothorax with black dorsal shield; abdominal segments full and rounded; true legs and prolegs absent, being replaced by protrusible fleshy swellings; colour grey with darker mid-dorsal stripe. It mines the leaves of the foodplant.

The pupa is enclosed in an oval cocoon of white silk constructed within the blotch-mine.

The perfect insect appears from October till March, and there are probably two or three complete generations in the year.

Genus 2.—MEGACRASPEDUS, Zell.

Basal joint of antennae without pecten. Labial palpi with second joint tufted towards apex beneath, terminal joint as long as second. Hind-wings with termen emarginate beneath produced apex; 3 and 4 remote, 5 nearer 6, 6 and 7 remote. (Plate F., figs. 25, 26 and 27 neuration and head of *Megacraspedus calamogona*.)

A genus of wide distribution, more developed in Australia than elsewhere.

Only one species is known in New Zealand.

MEGACRASPEDUS CALAMOGONA.

(*Megacraspedus calamogonus*, Meyr., Trans. N.Z. Inst., xviii., 163.)

(Plate XXVII., fig. 12 ♂, 13 ♀.)

This species, which may be at once distinguished by its peculiarly tufted palpi, has occurred at Waiouru in the

*Trans. N.Z. Inst., Iv., 331-336.

North Island and at Christchurch and Invercargill in the South Island.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are very elongate, narrow, with the apex acutely pointed; *pale ochreous with the veins more or less speckled with grey*; there is a minute brownish-black dot below the costa at $\frac{1}{4}$; two dots placed diagonally at $\frac{1}{2}$; a large dot in the disc at $\frac{3}{4}$ and a short streak at the apex. The hind-wings have the apex pointed and strongly projecting, pale whitish-ochreous, darker towards the tip. The cilia of all the wings are pinkish-ochreous.

Mr. Philpott informs me that the larva of this insect feeds in the seed-heads of the toetoe grass (*Arundo conspicua*). Its length when full-grown is about $\frac{1}{4}$ inch and its general colour dull yellowish, with a darker head.

Larvae have been observed in March and also in mid-winter.

The pupa is rather attenuated, pale reddish-yellow, with black eyes and a sharp spine on the posterior segment. It is enclosed in a slight silken cocoon amongst the seed-mass of its foodplant.

The perfect insect has been taken in August, September, November, February, March, April and May, and it therefore appears probable that there are at least two generations in each year.

Genus 3.—ARISTOTELIA, Hübner.

Basal joint of antennae without pecten. Labial palpi with second joint roughened beneath, terminal joint nearly as long, somewhat thickened. Fore-wings with 6 and 7 out of 8. Hind-wings with termen emarginate beneath acute apex; 3 and 4 remote, 5 nearer 6 than 4, 6 and 7 remote.

A large genus of general distribution, but represented in New Zealand by one species only.

ARISTOTELIA PARADESMA.

(*Isochasta paradesma*, Meyr., Trans. N.Z. Inst., xviii, 163.)

(Plate XXVII., fig. 15.)

Up to the present this interesting species has only been found at Auckland and at Invercargill. It appears to be a very rare insect.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are very narrow, elongate, with the costa arched before the apex and the termen oblique and slightly concave; white faintly speckled with pale brownish-grey; there is a large blackish-grey blotch at $\frac{1}{4}$, preceded by two very small blackish marks; two small black discal dots at $\frac{1}{2}$ and $\frac{3}{4}$; three very short dark grey costal bars before the apex and a pale grey cloud along the dorsum. The hind-wings are whitish-grey, with the apex very acute. The cilia of all the wings are brownish-grey, ochreous at the base.

The perfect insect appears from December till February, and frequents forest.

Described and figured from a specimen in Mr. Philpott's collection.

Genus 4.—EPITHECTIS, Meyr.

Basal joint of antennae without pecten. Labial palpi with second joint slightly rough beneath, terminal joint nearly as long as second. Fore-wings with veins 7 and 8 out of 6. Hind-wings

nearly 1, trapezoidal, apex pointed, produced, termen sinuate; 3 and 4 connate, 5 somewhat approximated, 6 and 7 stalked.

A widely-distributed genus represented in New Zealand by a single species.

EPITHECTIS ZOPHOCHALCA.

(*Epithecis zophochalca*, Meyr., Trans. N.Z. Inst., 1, 133.)

(Plate XXXVIII., fig. 2 ♂.)

This remarkable little insect has occurred at Auckland.

The expansion of the wings is about $\frac{1}{4}$ inch. The fore-wings are rather broad with the apex abruptly pointed; *bronzy-grey* with several large whitish scales towards the tip; there are obscure discal and plical marks. The hind-wings, which have the apex extremely pointed and the termen suddenly bowed, are brownish-bronze thickly speckled with darker brown scales. The cilia of all the wings are brownish-grey. The head is rather small and smooth; the thorax and abdomen are rather stout.

The perfect insect appears in January, and frequents scrubby forest. It is evidently a very rare species.

Genus 5.—STOMOPTERYX, Hein.

Labial palpi very long, second joint smooth-scaled, terminal longer than second. Fore-wings with vein 6 sometimes out of 7 near base. Hind-wings under 1, elongate-trapezoidal, apex acute, produced, termen sinuate, cilia 1½-2; veins 3 and 4 connate, 5 approximated, 6 and 7 stalked.

Represented by one Australian species only.

STOMOPTERYX SIMPLICELLA.

(*Gelechia simplicella* (*simplexella*), Walk., Tin. 1024; *Gelechia isoscelixantha*, Low., Proc. Linn. Soc. N.S. Wales, 1897, 272.)

(Plate LI., fig. 21 ♂.)

This species has occurred at Nelson.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical, blackish-grey speckled with paler grey, with several large black scales near the apex; there is a conspicuous pale ochreous spot on the costa beyond the middle; the cilia are blackish-grey. The hind-wings, which have the apex very strongly produced, are pale brownish-grey; the cilia are brownish-grey.

The perfect insect appears in February.

Mr. Meyrick states that this is a common Australian species, throughout southern half and Tasmania, doubtless artificially introduced to New Zealand; larva not observed, but without doubt on cultivated *Leguminosae* like its near allies throughout the world. It also occurs in India and China, but seems commonest in Australia, whence it was originally described 60 years ago.

Described and figured from a damaged specimen submitted by Mr. Philpott.

Genus 6.—THIOTRICA, Meyr.

Antennae in ♂ with long fine ciliations, basal joint without pecten. Labial palpi with second joint smooth, terminal joint as long as second. Fore-wings with 4 absent, 6 out of 7 or separate, 8 absent. Hind-wings with termen sinuate beneath pointed apex; 3 and 4 connate, 5 rather approximated, 6 and 7 stalked.

Fairly well developed in the Indian and Australian regions. There are three species in New Zealand.

THIOTRICHA TETRAPHALA.

(Thiotricha tetraphala, Meyr., Trans. N.Z. Inst., xviii., 164.)

(Plate XXVII., fig. 17.)

This rather inconspicuous species has occurred in the North Island at Waimarino and in the South Island at Christchurch, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate, with the costa almost straight and the termen very oblique; dull white, speckled and spotted with dark greyish-brown; the costal and basal areas are densely speckled; there is a conspicuous, elongate, oblique spot on the disc at about $\frac{1}{3}$; an oblong patch on the dorsum at $\frac{2}{3}$; a narrow, elongate mark before the apex, and a series of minute indistinct marginal marks before and beyond the apex. The hind-wings are pale grey.

According to Mr. Philpott the larva of this insect feeds on the manuka (*Leptospermum scoparium*) during the early summer. It constructs a case composed of the tips of the leaves of its food-plant placed one upon the other, each fragment covering about one-half of the preceding. When full-grown the length of the larva is about three-sixtenths of an inch and its general colour dull pink, with the head and first segment dark brown. It walks with about half its body projected from the case.

The pupa state is spent within the case constructed by the larva.

The perfect insect appears from January till March, but does not seem to be very common or generally distributed.

THIOTRICHA OLEARIAE, n. sp.

(Plate XLVII., fig. 7 ♂; Plate II., fig. 30 larva in case.)

At present this species has only been reared from the larva, which was discovered by Stella Hudson, at Breaker Bay, near the entrance to Wellington Harbour.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are rather narrow, with the costa almost straight, the termen oblique and the dorsum nearly parallel with the costa; dull white, much sprinkled and clouded with pale brown on the basal fourth and on the costal region from about $\frac{1}{3}$ to near the apex; there is a chain of black scales on the fold, terminating in a rather conspicuous black spot at about $\frac{1}{3}$; clusters of black scales are usually present near the tornal region, in the middle of the termen, near the apex and sometimes in the disc. The hind-wings, which have the apex strongly produced, are dull greyish-ochreous; the cilia of all the wings are brownish-grey.

The larva, which feeds on *Olearia solandri* in November, constructs a case about $\frac{1}{4}$ inch in length, strongly bent at its posterior third. It is apparently made of three braets of the *Olearia*, the earliest formed part of the case being at an angle with the two later formed portions, which are stouter and usually pretty well in alignment. The enclosed larva is very stout, greenish-brown, much wrinkled with the horny head, dorsal plate of second segment and legs blackish; minute prolegs are situated on segments 7-10. The last segment is horny with well-developed anal prolegs which retain a firm hold on the case.

The perfect insect emerges towards the end of January.

THIOTRICHA THORYBODES.

(Thiotricha thorybodes, Meyr., Trans. N.Z. Inst., xviii., 164.)

(Plate XXVII., fig. 16; Plate III., fig. 16, larva in case.)

At present this very obscure-looking species has only been observed at Wellington and at Christchurch.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate and narrow with veins 6 and 7 stalked; very dark brown, speckled with ochreous, with purplish-bronzy reflections; the markings are very indistinct, consisting of "a dark triangular patch on the costa before the middle, an obscure brown dot in the disc slightly beyond the middle and a pale ochreous spot in the disc at about $\frac{1}{2}$ " (Meyrick). The hind-wings and the cilia of all the wings are pale greyish-ochreous.

The larva, which feeds on the leaves of *Mühlenbeckia*, is slender, sooty black, with the head dark brown, the second and anal segments black and highly polished, and the skin of the rest of the body much wrinkled and furnished with a few extremely minute tubercles and isolated bristles. It constructs a portable case out of small dried fragments of the leaves of its food-plant, which are variously arranged, cases belonging to different individuals being of diverse shapes and sizes. The length of the case averages about $\frac{5}{8}$ inch. When attached to the food-plant this case is extremely inconspicuous, as it so closely resembles a curled fragment of dead leaf. On emergence the moth rests on the case for a considerable time, where it also exactly resembles a minute blackened fragment of leaf adhering to the case. This habit, combined with the highly protective character of the case, has no doubt shielded the species from many enemies.

The perfect insect appears in December and January, and frequents forest. Owing to its retired habits and obscure colouring it is very seldom noticed. Probably, however, it is actually much commoner than it appears to be.

Genus 7.—PHTHORIMAEA, Meyr.

Basal joint of antennae without pecten. Labial palpi with second joint expanded with rough projecting scales beneath, terminal joint as long as second or shorter. Hind-wings 1 or hardly over, with termen sinuate beneath acute apex; 3 and 4 connate, 5 somewhat approximated, 6 and 7 remote or approximated at base, posteriorly parallel.

A very extensive genus of wide distribution.

We have ten species in New Zealand, of which two are confined to the North Island, five to the South Island, and three common to both Islands.

PHTHORIMAEA OPERCULELLA.

(*Gelechia operculella*, Zell., Zool. Bot. Ver. 1873, 262; *terrella*, Walk., Cat. xxx., 1024 (praeocc.); *solanella*, Boisd., J.B. Soc. Centr. Hort. 1874, 713; Meyr., Proc. Linn. Soc. N.S.W. 1879, 112; Trans. N.Z. Inst., xviii., 166.)

(Plate XXVII., fig. 18 ♂.)

This very dull-coloured species has occurred at Taranaki, Napier and Wellington, in the North Island, and at Nelson, Christchurch, Dunedin and Invercargill in the South Island. It is reported as abundant throughout

Eastern Australia, where it is regarded as a highly injurious insect.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate-ovate with the apex rather acute and the termen very oblique; *pale greyish-ochreous thickly mottled and dotted with blackish-grey or brown*, especially near the base and dorsum; the principal veins are faintly marked with yellowish-brown, there are two or three small blackish spots near the base and a terminal series of blackish dots. The hind-wings are pale grey, furnished in the male with a long dense pencil of hairs from the costa at the base.

There is considerable variation in the depth of the brownish- or blackish-grey mottling on the fore-wings.

The larva feeds gregariously on the potato (*Solanum*) and is stated to eat the foliage in the summer, and the tubers whilst stored in the winter. When full-grown it is about $\frac{1}{2}$ inch in length, elongate, dull white, slightly tinged with pink, with the upper surface of the head and second segment brown. The legs are brown, slender, with the prolegs on the abdominal segments distinct, and the dorsal surface lightly clothed with scattered hairs. It spins a loose cocoon and generally pupates close under the skin of the tuber, protected by the surrounding debris. (Froggart).

This insect does very great damage, especially where potatoes are allowed to remain stored for any length of time, and sometimes destroys nine-tenths of the crop.

The perfect insect appears from November till May, coming freely to lamps, and flying at dusk in potato fields. The species has certainly been introduced with the potato, and is a native of North America, but is now widely spread in Australia, Africa and Europe.

Walker's name is really the older, but cannot be allowed to stand, as he appears to have overlooked the already existing *Gelechia terrella*, Hübn., a well-known and abundant European species. (Meyrick.)

PHTHORIMAEA THYRAULA.

(*Gelechia thyraula*, Meyr., Trans. N.Z. Inst., xviii., 167.)

(Plate XXVII., fig. 10.)

This pretty little species has occurred at Wellington, Christchurch, Castle Hill and Menzies' Ferry, near Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate, with the apex acute; *pale ochreous-yellow* there is a small blackish mark on the costa at the base; two small dots, one on the fold and one above it; *an irregular oblique blackish band on the costa at $\frac{1}{4}$ touching the fold; two discal spots near the middle*; several clusters of orange-brown scales in the disc; a scattered group of black scales before the apex, and a dense group at the apex. The hind-wings are pale grey.

The perfect insect appears from November till February, and is usually found in forest.

Described and figured from a specimen in Mr. Philpott's collection.

PHTHORIMAEA QUIETA.

(*Phthorimaea quieta*, Philp., Trans. N.Z. Inst., lvii., 706.)

(Plate LII., fig. 7 ♀.)

This very delicate-looking species was discovered by Mr. S. Lindsay at Bottle Lake, near Christchurch.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are lanceolate; *very pale grey, almost white; markings formed by irregular clusters of black scales*; two oblique bands from costa to fold before middle; a large irregular triangular patch on middle of costa; a second very much smaller patch beyond $\frac{1}{2}$; three ill-defined transverse bands before apex; between these markings the wing is more or less densely sprinkled with blackish-grey scales and there are some pale brown scales in the disc; the cilia are pale grey with a few isolated black scales. The hind-wings are pale brown with greyish-ochreous cilia.

Near *Phthorimaea thyraula*, but apparently distinguished by the very pale ground colour of fore-wings. Both species have rather indefinite markings.

The perfect insect appears in March.

Described and figured from a specimen in Mr. Lindsay's collection.

PHTHORIMAEA BRONTOPHORA.

(*Gelechia brontophora*, Meyr., Trans. N.Z. Inst., xviii., 168.)

(Plate XXVII., fig. 11.)

This little insect has occurred on the sea-coast near Wellington in the North Island. In the South Island it has been found at Christchurch and is common at Menzies' Ferry, near Invercargill.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are elongate, with the apex acute; *pale ochreous-yellow, densely but irregularly strewn with blackish-grey and brown scales*; there is a pale irregular bar at $\frac{1}{4}$ and an angulated pale band beyond the middle; *five irregular black discal spots, and a dense costal clouding from the base to the middle*, reaching as far as the fold. The hind-wings are pale grey with the apical cilia golden-ochreous.

This species somewhat resembles *Phthorimaea thyraula*, but the fore-wings are very much more thickly scattered with blackish scales and the discal spots much larger.

The perfect insect appears from November till February, and is usually found in forest. It seems to be a very local species.

Described and figured from a specimen in Mr. Philpott's collection.

PHTHORIMAEA CHERADIAS.

(*Gelechia cheradias*, Meyr., Trans. N.Z. Inst., xli., 12.)

(Plate XXVII., fig. 9.)

This rather distinctly-marked species was discovered by Mr. Philpott at New River near Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are pale ochreous-brown; there is a broad cloudy longitudinal stripe beneath the costa, extending from the base to the apex, and another similar stripe along the dorsum; *two black patches are situated on the fold at about $\frac{1}{4}$ and $\frac{1}{2}$; two much smaller black dots between $\frac{1}{4}$ and $\frac{1}{2}$, and a row of small black marks extends from slightly before the apex to the tornus*. The hind-wings are pale greyish-ochreous.

The perfect insect appears in December. Mr. Philpott informs me that it is very abundant amongst low-growing vegetation, on sandhills near the sea-coast.

PHTHORIMAEA MELANOPLINTHA.

(*Phthorimaea melanoplinta*, Meyr., *Exotic Microlepidoptera*, iii., 276, (1926.))

(Plate XXVIII, fig. 21 ♀.)

This species was bred from a larva boring the stems of tomatoes in the Hawkes Bay district.

The expansion of the wings is nine-sixteenths of an inch. The fore-wings, which have the apex acute, are pale ochreous, heavily sprinkled with blackish-brown scales, especially in the disc; the apical third is more or less suffused with reddish-brown; there is an indistinct darker basal patch; a very conspicuous black blotch in disc before middle, followed by a less distinct patch; the cilia are ochreous mixed with numerous blackish scales. The hind-wings, which have the apex much produced, are pale greyish-ochreous, irregularly sprinkled with darker grey, especially towards margins; the cilia are ochreous mixed with grey.

The perfect insect appears in January.

Described and figured from specimens submitted by the Department of Agriculture.

PHTHORIMAEA HETEROSPOREA.

(*Phthorimaea heterospora*, Meyr., *Trans. N.Z. Inst.*, iv., 204.)

(Plate L, fig. 12 ♂.)

This species has occurred at Whakapapa, Mount Ruapehu, at about 4,000 feet above sea-level.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are rather narrow with the apex very pointed; brownish-ochreous, broadly bordered with whitish on the dorsum; there is a central longitudinal black streak from the base to $\frac{3}{4}$, with a small yellow spot below it; a black dot in the disc and a terminal series of minute black dots. The hind-wings are rather broad, with the apex strongly produced, whitish-ochreous. All the cilia are whitish-ochreous.

The perfect insect appears in January, and may be looked for in sub-alpine forests.

PHTHORIMAEA GLAUCOTERMA.

(*Gelechia glaucotermia*, Meyr., *Trans. N.Z. Inst.*, xliii., 63.)

(Plate XXVII, fig. 19 ♂.)

This rather heavily-marked species was discovered by Mr. Philpott at New River, Invercargill. It has also occurred near Christchurch.

The expansion of the wings of the male is slightly over $\frac{3}{4}$ inch; of the female about five-sixteenths of an inch; the fore-wings of the male are dark brownish-grey, with black and bluish-white markings; there is an obscure black mark at the base; two black dots placed obliquely on the fold and a large black spot beyond the middle; a patch of bluish-white scales is situated near the base; an oblique bar on the costa at $\frac{1}{2}$; an elongate patch in the middle of the disc and a large diffused patch occupies most of the apical area. The hind-wings are very pale brownish-ochreous, grey at the apex. The female has the wings much abbreviated and acutely pointed; the fore-wings are densely suffused with blackish scales, except on the costa near base, and on the median and terminal areas.

The perfect insect appears from October till January and usually frequents open sandhills, on the sea coast. Mr. S. Lindsay, who found the insect at Bottle Lake, near Christchurch, informs me that the female appears incapable of true flight, but hops about with great rapidity and is difficult to capture.

Described and figured from specimens kindly supplied by Messrs. Philpott and Lindsay.

PHTHORIMAEA HIPPEIS.

(*Gelechia hippeis*, Meyr., *Trans. Ent. Soc. Lond.*, 1901, 573.)

(Plate XXVII, fig. 20.)

This species has occurred at Christchurch.

The expansion of the wings is $\frac{1}{4}$ inch. The head is pale ochreous and the thorax purplish-brown. The fore-wings are elongate, with the apex acute and the termen very oblique; ochreous, very densely covered with dark brown scales with purplish reflections; there is a distinct brown discal dot beyond the middle, but no other definite markings; the cilia are ochreous. The hind-wings are pale brownish-ochreous.

The perfect insect appears in December, and is attracted by light.

Described and figured from a specimen in the Fereday collection.

PHTHORIMAEA PLEMOCHOA.

(*Phthorimaea plemochoa*, Meyr., *Trans. N.Z. Inst.*, xlviii., 415.)

(Plate XXVIII, fig. 23 ♂, 24 ♀.)

This interesting little species was discovered at Otira.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings of the male are dull white, broadly clouded and speckled with brownish-grey on the dorsum; there is generally an elongate brown patch on the costa before the apex. The hind-wings and the cilia of all the wings are grey. In the female all the wings are shorter and narrower than in the male; the fore-wings are pale brown with numerous white scales on the costa towards the base and in the disc beyond the middle. The abdomen in both sexes is almost black.

This species varies considerably in size, and in the extent of the white colouring, which sometimes covers almost the whole of the fore-wings.

The perfect insect appears in December and January, frequenting open grassy places, where it is locally very abundant. It flies with extraordinary activity from blade to blade of the grass, resting near the summit of each blade. It is very difficult to catch and escapes from the net or box with lightning rapidity.

Genus 8.—GELECHIA, Hübner.

Basal joint of antennae without pecten. Labial palpi with second joint expanded, with rough projecting scales beneath, terminal joint as long as second or shorter. Hind-wings over 1, termen somewhat sinuate beneath apex; 3 and 4 connate, 5 rather approximated, 6 and 7 approximated at base or stalked, posteriorly diverging. (Plate F, figs. 28, 29, 30. Neuration and head of *Gelechia monophragma*.)

A very large genus, principally characteristic of Europe, Africa, and America.

Only ten species are known in New Zealand at present, of which one is confined to the North Island; seven to the South Island, and two common to both islands.

GELECHIA SCHEMATICA.

(*Gelechia schematica*, Meyr., Trans. N.Z. Inst., xviii., 168.)

(Plate XXVIII., fig. 7.)

This rather inconspicuous species has occurred at Castle Hill, Bealey River, Ida Valley, Central Otago, and Queenstown, Lake Wakatipu, at elevations of from 2,000 to 3,000 feet above the sea-level.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are pale brownish-ochreous, faintly speckled with warmer brown; there is a greyish band along the costa from the base to about $\frac{3}{4}$, heavily speckled with dull black and usually divided towards the base by a streak of the ground colour; there are three dark brown discal spots; the cilia are greyish mixed with ochreous. The hind-wings are very pale whitish-grey, very faintly speckled with darker grey; there is an obscure brownish streak near the base; the cilia are pale ochreous.

The perfect insect appears in December and January.

GELECHIA PARAPLEURA.

(*Gelechia parapleura*, Meyr., Trans. N.Z. Inst., xviii., 168.)

(Plate XXVIII., fig. 6.)

This rather distinctly-marked species has occurred at the Bealey River, Canterbury, at an elevation of about 2,100 feet above the sea-level. It has also been found at Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The head is pale ochreous and the thorax dark purplish-brown. The fore-wings are elongate-oval with the apex rounded and the termen very oblique; the costal half is dark brown and the dorsal half pale ochreous; there is an obscure brown spot on the fold, another in the disc near the middle, and a third beyond the middle. The hind-wings are greyish-ochreous.

The perfect insect appears in January.

Described and figured from a specimen in the Fereday collection.

GELECHIA PHARETRIA.

(*Gelechia pharetria*, Meyr., Trans. N.Z. Inst., xviii., 169.)

(Plate XXVIII., fig. 25 ♂, 26 ♀.)

This rather obscure-looking species has occurred at Mount Arthur, Castle Hill, Arthur's Pass and Ida Valley, at elevations ranging from 2,500 to 4,000 feet above the sea-level.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are rather elongate, with the apex acute and the termen moderately oblique; very pale brownish-ochreous, with the veins obscurely marked in brown and dotted with black; there is a fine brown streak along the fold and two brown discal dots, one before and one beyond the middle. The hind-wings are whitish-ochreous.

The perfect insect appears in January, and is stated to be locally abundant amongst rough flowery herbage.

Described and figured from specimens captured by J. H. Lewis and R. W. Fereday.

(GELECHIA AEROBATIS.

(*Gelechia aerobatis*, Meyr., Trans. N.Z. Inst., iv., 204.)

(Plate XLV., fig. 24 ♂.)

Two specimens of this species have occurred on Mount Arthur, at an elevation of about 3,500 feet above the sea-level.

The expansion of the wings is five-sixteenths of an inch. The fore-wings are rather narrow with the apex very acutely pointed; brownish-ochreous, much paler on the costa; there is a shaded central longitudinal streak containing two or three darker dots beyond the middle, and a series of obscure terminal dots; the cilia are pale ochreous-brown mixed with darker brown. The hind-wings are rather broad, with the apex acutely produced, ochreous grey; the cilia are ochreous-grey. The head and thorax are pale brownish-ochreous and the abdomen grey.

The perfect insect appears in January and may be looked for in sub-alpine forests.

GELECHIA MONOPHRAGMA.

(*Gelechia monophragma*, Meyr., Trans. N.Z. Inst., xviii., 169.)

(Plate XXVIII., fig. 4, 5 variety.)

This very distinctly-marked species has occurred at Hamilton, Waimarino, Napier, Wellington and Invercargill. It is probably fairly common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are very pale brownish-ochreous; there is a rather narrow black longitudinal streak in the middle from the base to the apex. The hind-wings, which have the apex acute and the termen slightly waved, are very pale greyish-white. The cilia of all the wings are pale whitish-ochreous. There is considerable variation in the width and intensity of the central streak, which is rarely interrupted.

The perfect insect appears in December and January and flies freely in the late afternoon. It usually frequents open grassy places on the edges of forest or scrub, but does not appear to be a very common species.

GELECHIA DIVIDUA.

(*Gelechia dividua*, Philp., Trans. N.Z. Inst., liii., 340.)

(Plate XLVIII., fig. 36 ♂.)

This very distinctly-marked little species was discovered by Mr. C. C. Fenwick at Paradise, Lake Wakatipu. It has also occurred in Central Otago.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are elongate with the apex pointed; dull greyish-brown; there is a conspicuous black streak along the fold reaching fully $\frac{1}{2}$ its entire length, and another streak from the apex terminating in the disc slightly before the end of the basal streak; there are a few scattered whitish scales before the apex. The hind-wings, which have the apex very strongly produced, are very pale dull greyish-ochreous. All the cilia are dull greyish-ochreous.

The perfect insect appears in January.

Described and figured from Mr. Fenwick's specimen.

GELECHIA LITHODES.

(*Gelechia lithodes*, Meyr., Trans. N.Z. Inst., xviii., 170.)

(Plate XXVIII., fig. 2.)

This interesting species has occurred at the Maungataririri River, near Mount Holdsworth, in the North Island, and at Arthur's Pass, Bealey River, Dunedin, and Lake Wakatipu, in the South Island.

The expansion of the wings is rather over $\frac{3}{4}$ inch. The fore-wings are bluish-grey; there are dark discal spots before and beyond the middle. The hind-wings are pale greyish-ochreous, faintly speckled with darker grey.

In some specimens the grey colouring of the fore-wings is much duller and less blue than in others.

The perfect insect appears in January. It frequents stony situations, usually in river-beds, or on mountains, where its bluish-grey colouring is highly protective.

GELECHIA LAPILLOSA.

(*Gelechia lapillosa*, Meyr., Trans. N.Z. Inst., lv., 203.)

(Plate XXXI., fig. 17 ♂.)

This very dark-looking species has occurred abundantly in the bed of the Whakapapa River, on the slopes of Mount Ruapehu, at an elevation of 4,000 feet above sea-level.

The expansion of the wings is $\frac{5}{8}$ inch. The fore-wings are slaty-black, irregularly sprinkled with dull white; the markings are cloudy, formed by an absence of the white sprinkling; the costal and dorsal edges are somewhat darkened; there are three blotches in the disc, more or less connected with costa by dark suffusion; and a broad, strongly angulated, whitish transverse band at about $\frac{1}{4}$. The hind-wings are pale grey.

This species is closely allied to *Gelechia lithodes*, but the very dark colouring of the fore-wings immediately distinguishes it from that species.

The perfect insect appears in January. It rests on boulders, where it is practically invisible.

GELECHIA CAERULAEA.

(*Gelechia caerulaea*, Huds., Ent. Mo. Mag., lxi., 221.)

(Plate LII., fig. 5 ♂.)

This very beautiful little insect was discovered by Mr. C. E. Clarke, at the Waiho River, Westland.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are pale blue with slaty-black markings; a broad oblique band at base; another oblique band before middle, containing plical and first discal stigmata; a third considerably suffused band at $\frac{3}{4}$, containing a large black discal spot; a longitudinal band along dorsum joining the above described transverse bands; the outer third of wing, which is pale blue, has a few scattered slaty-black scales, some forming indefinite dots along costa and termen. The hind-wings are very pale greyish-ochreous. All the cilia are greyish-ochreous.

The perfect insect appears in January.

Described and figured from a very perfect specimen kindly sent to me by Mr. Clarke.

GELECHIA NEGLECTA.

(*Gelechia neglecta*, Philp., Trans. N.Z. Inst., lv., 665.)

(Plate LI., fig. 14 ♂.)

This very pale coloured species was discovered by Mr. Philpott in the Cobb Valley, near Mount Arthur, Nelson.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are lanceolate, almost uniform pale brownish-ochreous; there are a good many very pale reddish-brown scales scattered along the fold and a reddish-brown spot in the disc at about $\frac{3}{4}$; the cilia are pale brownish-ochreous. The hind-wings and cilia are very pale greyish-ochreous.

The perfect insect appears in December.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

Genus 9.—ANISOPLACA, Meyr.

Basal joint of antennae without pecten. Labial palpi with second joint densely scaled, with rough projecting scales beneath towards apex, prominent below apex, terminal joint as long as second or longer, stout. Hind-wings over 1, termen hardly sinuate beneath obtuse apex; 3 and 4 connate, 5 approximated, 6 and 7 near and parallel on basal half, diverging posteriorly.

Occurs also in South America and South Africa. There are three species in New Zealand.

ANISOPLACA ACRODACTYLA.

(*Gelechia acrodactyla*, Meyr., Trans. N.Z. Inst., xxxix., 117.)

(Plate XXVIII., fig. 3.)

This pretty species was discovered by Mr. Philpott at Invercargill. It has also occurred at Dunedin and Wyndham.

The expansion of the wings is about $\frac{5}{8}$ inch. The head and palpi are whitish-ochreous, the terminal point of the palpi having a single blackish ring; the antennae are ochreous with black rings. The fore-wings are narrowly oblong with the termen moderately oblique, very pale brownish-ochreous, clouded and speckled with brown near the base and margins; there is a conspicuous blackish-grey blotch at about $\frac{1}{4}$; a broad irregular patch of brown extends across the wing at $\frac{3}{4}$, and is followed by a wavy transverse band of the pale ground colour; the apex and terminal area is also brown. The hind-wings are grey, the cilia are pale ochreous with a dusky basal line.

The perfect insect appears in November and December, and frequents forest. It seems to be very local.

ANISOPLACA ACHYROTA.

(*Gelechia achyrotia*, Meyr., Trans. N.Z. Inst., xviii., 170.)

(Plate XXVIII., fig. 1.)

This rather dull-looking species has occurred at Ashhurst in the North Island and at Tapawera, near Nelson, Christchurch, Dunedin and Lake Wakatipu in the South Island.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are narrow-oblong, with the termen rather obliquely rounded; dull brownish-ochreous, speckled and clouded with blackish-grey, especially on the fold near the base and on the termen and dorsum; there is a small blackish spot on the costa at the base; four minute pale-ringed discal dots, two on the fold

at about $\frac{1}{2}$ and two in the disc at about $\frac{2}{3}$; a broad, cloudy transverse band at about $\frac{1}{2}$, leaving a wavy paler line between it and the terminal shading. The hind-wings are pale greyish-ochreous, darker towards the apex.

The perfect insect appears from December till February, and frequents forest. It seems to be attached to the lace bark (*Gaya Lyallii*), but is evidently a very local insect. Mr. Meyrick states that it is remote from the other New Zealand species of the genus, approaching *Tachyptilia populella* in form and superficial appearance.

ANISOPLACA PTYOPTERA.

(*Anisoplaca ptyoptera*, Meyr., Trans. N.Z. Inst., xviii., 171.)

(Plate XXXVIII., fig. 1.)

This very remarkable-looking species has occurred at Christchurch.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are narrow-oblong with the termen almost straight; dark ochreous-grey, with the veins clearly marked in pale greyish-ochreous; there is a faint dot on the fold; a conspicuous black discal dot at $\frac{1}{2}$ and a double dot at $\frac{2}{3}$, each being surrounded by a pale ring. The hind-wings are dull greyish-ochreous with a fainter marginal band.

The perfect insect appears in February and March.

Described and figured from a specimen kindly lent to me by Mr. F. S. Oliver.

Genus 10.—SITOTROGA, Hein.

Basal joint of antennae long, with pecten. Labial palpi with second joint rough beneath, terminal longer than second. Fore-wings with veins 7 and 8 out of 6. Hind-wings under 1, elongate trapezoidal, apex pointed, produced, termen emarginate, cilia 2; veins 3, 4, 5 remote and parallel, 6 and 7 stalked.

Represented by one widely-distributed species, which has no doubt been introduced through the agency of man.

SITOTROGA CEREALELLA.

(*Sitotroga cerealella*, Ol., Stand. Cat. Pal. Lep. No. 2902; Meyr. Proc. Linn. Soc. N.S. Wales, xxix., 286 (1904).)

(Plate XL., fig. 10 ♀.)

This species has occurred at Levin in the Manawatu district.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are lanceolate, dull ochreous sprinkled with brown scales towards the apex; there is a small brown mark on the costa at the base and obscure discal dots at about $\frac{1}{2}$ and $\frac{2}{3}$; the cilia are ochreous with brown tips. The hind-wings, which have the apex very strongly produced, are greyish-ochreous; the cilia are ochreous.

Of this species Mr. Meyrick remarks: "Apparently not previously recorded from New Zealand (1921), but I am surprised it has not been found earlier; it is generally spread in all countries not too cold as a pest of stored grain (wheat, rice, etc.), to which the larva is very destructive; it is abundant in Australia. It may be looked for in cornbins and granaries. The full synonymy and list of references is considerable."*

*Trans. N.Z. Inst. Hiv., 164.

Described and figured from specimens submitted by the Department of Agriculture.

Sub-family 2.—DIPLOSARIDES.

This sub-family approaches the *Cosmopterygides*, but is distinguished from that sub-family by the absence of the pronounced costal shoulder with scale-projection at about $\frac{1}{2}$ of hind-wings, the costal edge being quite regularly arched. As hitherto known it is entirely restricted to the Hawaiian Islands, where it constitutes the mass of the Micro-Lepidopterous fauna, the known species approaching 300, and indicating a probable total of quite 500. The following species (quite certainly a characteristic member of the sub-family) is the first discovered elsewhere, and is therefore of very great interest; but it must be observed that the *Tineidae* of the other Pacific islands are hardly at all known yet, and some may be found there. The new species would seem, however, to be an extreme straggler from the centre of development.

Genus 1.—IRENICODES, Meyr.

Head with appressed scales, side tufts somewhat raised; ocelli small, posterior; tongue developed. Antennae $\frac{3}{4}$, in ♂ moderate, filiform, simple, basal joint moderately elongate, without pecten. Labial palpi moderately long, curved, ascending, rather slender, with appressed scales, terminal joint shorter than second, acute. Maxillary palpi rudimentary. Posterior tibiae clothed with long hairs above. Fore-wings with 1b short-furcate, 2 from angle, 3 absent, 6 and 7 out of 8, 7 to costa, 11 from middle. Hind-wings $\frac{3}{4}$, narrow-lanceolate: cilia 3; 2-4 parallel, 5 absent, cell open between 4 and 6, 6 and 7 stalked. (Plate G., figs. 22, 23, 23a neurulation and head of *Irenicodes eurychora*.)

This genus represents an advanced form of the family, and therefore offers no assistance towards the problem of the geographical origin of the oldest portion of the Hawaiian fauna.

IRENICODES EURYCHORA.

(*Irenicodes eurychora*, Meyr., Trans. N.Z. Inst., li., 352.)

(Plate XLVI., fig. 10 ♂.)

This stout-looking little insect has occurred on the sandhills at Paekakariki.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elliptical rather bright ochreous broadly margined with dark greyish-brown on the costa and dorsum. The hind-wings and cilia of all the wings are dark brown. The head and thorax are ochreous; the abdomen brown with ochreous tuft.

The perfect insect appears in March, and may be looked for amongst rough vegetation on coastal sandhills.

Sub-family 3.—OECOPHORIDES.

Head with appressed hairs. Labial palpi long, recurved, acute. Maxillary palpi very short, appressed. Fore-wings with 1b furcate, 2 from near angle, 7 and 8 stalked. Hind-wings from trapezoidal-ovate, elongate-ovate, or ovate-lanceolate; 3 and 4 connate, seldom approximated, 5-7 nearly parallel, rarely 6 and 7 stalked. (Plate G., figs. 4-21; 24-34, 35, 36 and 40; Plate H., figs. 1-6.)

A very large sub-family, but especially characteristic of Australia and New Zealand; it is also well developed elsewhere, but does not form nearly so large a proportion of the whole fauna as it does in these two regions. It is very remarkable that under these circumstances the Australian and New Zealand representatives of the sub-family are not at all nearly related together, and evidently do not proceed from an immediate common origin.*

Represented in New Zealand by the following twenty-seven genera:—

- | | |
|-----------------------|-------------------|
| 1. ENDROSIS. | 15. BAREA. |
| 2. SCHIFFERMUELLERIA. | 16. EULECHRIA. |
| 3. BORKHAUSENIA. | 17. LOCHEUTIS. |
| 4. LEPTOCROCA. | 18. PAROCYSTOLA. |
| 5. CHERSADAULA. | 19. EUTHICTIS. |
| 6. EUCHERSADAULA. | 20. OXYTHECTA. |
| 7. COMPSISTIS. | 21. PHILOBOTA. |
| 8. THAMNOSARA. | 22. NYMPHOSTOLA. |
| 9. GYMNOBATHRA. | 23. PROTEODES. |
| 10. AOCHLETA. | 24. LATHICROSSA. |
| 11. IZATHA. | 25. CRYPTOLECHIA. |
| 12. TRACHYPEPLA. | 26. SYMMOCA. |
| 13. COROCOSMA. | 27. EUTORNA. |
| 14. ATOMOTRICHIA. | |

Group A. *Oecophoridi*.

Antennae in ♂ regularly ciliated; 7 of fore-wings to costa.

Genus 1.—ENDROSIS, Hübner.

Hind-wings ovate-lanceolate; 5 absent. (Plate G., figs. 4, 5, 6 neururation and head of *Endrosis lacteella*.)

The single species is domestic and artificially introduced in many parts of the world, its origin being uncertain.

ENDROSIS LACTEELLA.

(*Endrosis lacteella*, Schiff. Syst. Verz. 139; *Endrosis fenestrella*, Stt.; Meyr., Trans. N.Z. Inst., xxi., 160; *Gelechia subditella*, Walk., Cat. xxix., 657.)

(Plate XXVIII., fig. 12.)

This well-known domestic species, which has been introduced by man, is very common in houses throughout the country.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are dull white densely speckled with brownish-grey and with obscure blackish markings; there is a small white patch at the base and more or less indefinite blackish patches before the middle, beyond the middle and near the apex. The hind-wings are pale greyish-ochreous; the head and thorax are clear white and the abdomen pale brown.

The larva, which feeds on seeds, dry refuse, pollard, etc., is dull yellowish-white with the head reddish-brown and the hinder portion of the second segment pale brown. Its length, when full-grown, is about $\frac{3}{4}$ inch. The pupa is enclosed in a tough silken cocoon covered with refuse.

The perfect insect is found in houses and gardens throughout the year, but is commonest during the summer.

*An account of the male Genitalia of the N.Z. members of this sub-family is given by Mr. Philpott in the Trans. N.Z. Inst., lviii., 102.

It is often seen sitting on windows, and is very abundant in barns and granaries where there is always a plentiful supply of food for the larva.

Genus 2.—SCHIFFERMUELLERIA, Hübner.

Basal joint of antennae without pecten. Hind-wings ovate-lanceolate. Moderately numerous; chiefly confined to the Northern Hemisphere. (Plat H., figs. 1, 2, 3 neururation and head of *Schiffermuelleria orthophanes*.)

We have one species in New Zealand.

SCHIFFERMUELLERIA ORTHOPHANES.

(*Compstis orthophanes*, Meyr., Trans. Ent. Soc. Lond., 1905, 243.)

(Plate XXVIII., fig. 17.)

This clearly-marked little species has occurred at Auckland, Waimarino, Wellington, Nelson and Invercargill. Formerly it was extremely rare, but of late years has become comparatively common.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings, which have the termen obliquely rounded, are dark brownish-black with a slight purplish gloss; there are three broad, rather irregular, broken transverse yellow bands. The hind-wings are dark brown.

The perfect insect appears from September till March, and is usually observed indoors. It is a very active insect and seems likely to have acquired semi-domestic habits, which would account for its recent increase in numbers.

Genus 3.—BORKHAUSENIA, Hübner.

Basal joint of antennae with pecten. Hind-wings elongate-ovate or ovate-lanceolate. (Plate G., figs. 7, 8, 9 neururation and head of *Borkhausenia armigerella*.)

A large genus of general distribution, but proportionately more numerous in New Zealand than anywhere else, where it is represented by no less than sixty species. Of these six are confined to the North Island; thirty-seven to the South Island and seventeen common to both islands.

Its members are all rather small insects, ranging from $\frac{1}{2}$ to $\frac{3}{4}$ inch in expanse of wing. The species generally frequent scrub, or open forests, and some of them are extremely abundant. The colouring is chiefly protective and usually imitative of fallen leaves. Most of the species drop to the ground when disturbed and thus escape detection. A few of these insects have well-defined markings, but in the majority they are very indefinite. They thus offer great difficulties both in respect of description and delineation, and, as a result, the genus includes a larger number of doubtful species than usual.

The larvae are subterranean and sluggish in their habits, mostly living in tubes constructed of silk and refuse. They have the head and thoracic segments unusually small, the remaining segments being very large and cylindrical with minute and feeble prolegs. The food of the larvae appears to be roots, or possibly in some cases decaying vege-

table matter. They live through the winter, pupation taking place in the early spring.

The perfect insects mostly appear in early summer.

For many years the genus was known by the much more pleasing and appropriate name of *Oecophora*, or "house-bearer," having reference to the roof-like appearance of the wings in repose. The present name has, however, to be adopted in accordance with the law of priority.

A list of the New Zealand species of *Borkhausenia*, with a series of figures of male genitalia, by Mr. Philpott, appears in the Transactions of the New Zealand Institute, vol. lvi., pp. 399-413.

BORKHAUSENIA CHRYSOGRAMMA.

(*Oecophora chrysogramma*, Meyr., Trans. N.Z. Inst., xvi. 44.)

(Plate XXIX., fig. 6.)

This very handsome and striking species has occurred in the North Island at Waimarino and at several localities near Wellington. In the South Island a much duller form has been found at Lake Wakatipu, Invercargill and Waiau.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which are rather broad, nearly oblong, with the termen oblique, are very deep golden-yellow with heavy black markings; there are two very broad oblique transverse bands at about $\frac{1}{4}$ and $\frac{3}{4}$; a large triangular mark from the costa at $\frac{1}{4}$ joins the second band immediately above the tornus; there is a narrow terminal streak and the cilia are black; all the black markings have strong purple reflections. The hind-wings are very rich brown with copper reflections. The body is also brown.

The perfect insect appears in January and February, and frequents open scrub. It sometimes rests on leaves in the sun, but is very seldom observed flying, being usually captured by beating the branches of shrubs into an inverted umbrella. It is a very rare species, and several years may elapse without our seeing a single specimen of this fine insect. It seems, however, to be most partial to small miro trees (*Podocarpus ferruginea*), growing on hill tops about 1,000 feet above the sea-level.

BORKHAUSENIA COMPSOGRAMMA.

(*Borkhausenia compsogramma*, Meyr., Trans. N.Z. Inst., lii., 31;

Borkhausenia xanthodesma, Philp., Trans. N.Z. Inst., liv., 151.)

(Plate XXIX., fig. 5.)

This handsome insect has occurred in the North Island on Mount Ruapehu and at Kaitoke. In the South Island it has been found in Otago, on the Humboldt Range at the head of Lake Wakatipu at about 3,600 feet above the sea-level, and on the Hunter Mountains.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings, which are rather narrow with the termen straight and oblique, are dull purplish-lead colour speckled with black and with golden-orange markings; there is a small patch at the base; a broad, slightly curved, oblique transverse band from the costa at $\frac{1}{4}$ not quite reaching the dorsum; another broader band from beyond the middle of the costa to the tornus; a triangular mark from the costa before the apex joins the second band before the tornus; there is also a narrow terminal line. The hind-wings are silvery grey.

There is considerable variation in the extent of the golden-orange markings as well as in the depth of the ground colour.

The perfect insect appears from December till March and seems to frequent forests, often at considerable elevations. Although closely allied to *B. chrysogramma* it is quite distinct from that species.

BORKHAUSENIA HONORATA.

(*Borkhausenia honorata*, Philp., Trans. N.Z. Inst., l., 128.)

(Plate XXXVIII., fig. 8 ♀.)

This handsome species has occurred in the South Island at the head of Lake Wakatipu, at Invercargill and at Knife and Steel Boat-Harbour (Fiord County).

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rich chocolate-brown with yellow and leaden-metallic markings; there is a broad yellow band along the dorsum; a large oblique oval yellow patch on the costa before the apex partly encircled, first with dark chocolate-brown, and then with dull leaden-metallic scales; the costa is broadly edged with a dull metallic sheen, and there is a large patch of bright metallic scales in the disc at $\frac{1}{4}$ and a fainter patch near the base. The hind-wings are dark brown with faint bronzy reflections.

The perfect insect appears in January. It is a rare species, but may be looked for in damp openings in forest, in the far south, especially at considerable elevations.

BORKHAUSENIA LOXOTIS.

(*Borkhausenia loxotis*, Meyr., Trans. Ent. Soc. Lond., 1905, 241.)

(Plate XXIX., fig. 3.)

This rather dull-looking but clearly marked little species has occurred at Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings, which are rather narrow, are dull brown; there is an oblique pale yellow band from $\frac{1}{4}$ of costa to $\frac{3}{4}$ of dorsum; a rather large pale yellow discal spot at about $\frac{1}{2}$, and an indistinct pale mark on the costa before the apex; all the yellow markings are bordered with a few black scales. The hind-wings are dull brown.

The perfect insect appears in December and January. It is usually found in gardens and often enters houses. It was formerly a very rare species, but is now comparatively common, having probably acquired semi-domestic habits. When at rest the wings are tightly closed, slightly raised posteriorly and terminating in a very sharp point; the antennae are placed backwards and strongly divergent and the legs are more exposed than usual. In this position it probably imitates a small broken twig, or thorn, the elevation of the posterior portion being very remarkable. Mr. Meyrick points out that this insect is intermediate between *B. siderodeta* and *B. chrysogramma*, but quite distinct from either.

BORKHAUSENIA HOPLODESMA.

(*Oecophora hoplodesma*, Meyr., Trans. N.Z. Inst., xvi., 44; Trans. Ent. Soc. Lond., 1901, 574; *Borkhausenia thranas*, Meyr., ib., 1905, 240.)

(Plate XXIX., fig. 4.)

This small but very distinct and pretty species has occurred at Whangarei in the North Island, and at Nelson,

South Rakaia, Dunedin and Lake Wakatipu in the South Island.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings, which are elongate with the termen extremely oblique, are pale canary yellow, with very pale grey markings thickly speckled with dark grey; there is a rather broad costal edging from the base to near the middle; a cloudy spot on the dorsum near the base; three broken, ill-defined oblique transverse bands at about $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$, and a cloudy patch at the apex. The cilia are pale yellow mixed with grey. The hind-wings are grey.

There is considerable variation in the grey transverse bands, which are sometimes indistinct or absent, and sometimes replaced by a general vague speckling. The species is, however, quite distinct and easily recognised.

The perfect insect appears from January to March, frequenting beech* forests. It is a rare species.

BORKHAUSENIA AFFINIS.

(*Borkhausenia affinis*, Philp., Trans. N.Z. Inst., lvi., 391.)

(Plate LI., fig. 3 ♂.)

This narrow-winged species was discovered by Mr. Philpott at Nelson.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are very narrow, dull grey, very heavily sprinkled with dark brownish-grey scales. Except at the extreme base, the area below the fold is bright ochreous; there is an ochreous discal dot at about $\frac{1}{4}$ and the apical area is sprinkled with ochreous scales. The hind-wings, which have the apex acutely pointed, are greyish-brown.

The perfect insect appears in December.

Described and figured from a specimen submitted by Mr. Philpott.

BORKHAUSENIA PARATRIMMA.

(*Borkhausenia paratrimma*, Meyr., Trans. N.Z. Inst., xlii., 65; xliii., 63.)

(Plate XXIX., fig. 22.)

This inconspicuous species was discovered at Invercargill by Mr. Philpott.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings, which are rather narrow with the termen very obliquely rounded, are reddish-brown strongly tinged with ochreous and more or less speckled with grey, especially towards the margins; there are two very indefinite oblique bands of grey and the usual discal dots are obscurely indicated. The hind-wings are grey.

The perfect insect appears in November and December, but is rarely met with. Mr. Meyrick remarks that this is a distinct, though inconspicuous species, which may be regarded as an early form of the *siderodeta* group.

BORKHAUSENIA SIDERODETA.

(*Oecophora siderodeta*, Meyr., Trans. N.Z. Inst., xvi., 43.)

(Plate XXIX., fig. 9.)

This active, sun-loving, little species is probably common and generally distributed throughout the country.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which are rather narrow with the apex pointed and the termen

very obliquely rounded, are dull greyish-brown very thickly speckled with dull ochreous or more rarely reddish-brown, intermediate forms often occurring. The hind-wings are dark greyish-brown.

The perfect insect appears from October till February, and usually frequents somewhat open situations. It often flies in the late afternoon sunshine, when it is extremely difficult to see. It is also common in cultivated places and is frequently seen resting on fences or tree-trunks. Whilst thus engaged the antennae are placed backwards and held divergent; the fore- and intermediate legs exposed but placed backwards; the wings closely wrapped around the body, the posterior extremity being considerably elevated and the head depressed. In this position the entire insect closely resembles a minute pointed twig.

Mr. Philpott points out that specimens from Stewart Island are larger than those from any other locality.*

BORKHAUSENIA MELANAMMA.

(*Borkhausenia melanamma*, Meyr., Trans. Ent. Soc. Lond., 1905, 240; ? *B. sabulosa*, Philp., Trans. N.Z. Inst., l., 128; ? *B. terrena*, ib., lvi., 392.)

(Plate XXIX., fig. 2.)

This small and inconspicuous species was discovered by Mr. J. H. Lewis at Ida Valley, Central Otago. It has also occurred on Ben Lomond, Lake Wakatipu.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are pale grey densely speckled with blackish-grey, the darker colour tending to form four indistinct transverse bands. The hind-wings are grey.

The perfect insect appears in December and January. It is evidently extremely closely allied to *B. siderodeta*, being similar in form of wing but differing in its grey appearance, the absence of ochreous-yellow colouring and the paler hind-wings. Both species are somewhat variable but appear to be quite distinct. *Borkhausenia sabulosa*, Philp., is stated to resemble *B. melanamma*, but is smaller and more speckled. *B. terrena*, Philp., is described as having a different contour of fore-wing, with complete absence of markings.

BORKHAUSENIA XANTHOMICTA.

(*Borkhausenia xanthomicta*, Meyr., Trans. N.Z. Inst., xlvi., 415.)

(Plate XXIX., fig. 8 ♀.)

This very distinct, brightly-marked species has occurred at several localities in the immediate vicinity of Wellington, at Queenstown, Lake Wakatipu and at Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are widest before the middle, with the apex pointed and the termen very obliquely rounded; blackish-grey, sometimes speckled with whitish; the markings are yellow clouded with orange-red towards the disc; there is an elongate patch on the fold near the base; three broad oblique bands at $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$, sometimes touching the costa; the cilia are blackish mixed with orange-red and yellow. The hind-wings and cilia are rich brown.

**Nothofagus*.

*Trans. N.Z. Inst., xlix., 229.

The perfect insect appears in December. It is found in open scrub on hills and may be attached to *Coprosma areolata*. When at rest it assumes a similar position to that taken up by *B. siderodactyla*. Mr. Meyrick remarks that it is intermediate between that species and *B. chrysogramma*.

BORKHAUSENIA MARANTA.

(*Occophora maranta*, Meyr., Proc. Linn. Soc. N.S.W. 1885, 791.)

(Plate XXIX., fig. 1.)

This pale-coloured and very narrow-winged species has occurred at Dunedin, Mount Ida, Central Otago, Mount Earnslaw, and Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate with the apex pointed and the termen extremely oblique; very pale ochreous; there is a faint longitudinal streak traversing the middle of the wing from the base to the apex. The hind-wings are very pointed, pale grey, becoming darker near the apex. The head and thorax are pale ochreous and the abdomen brown.

According to Mr. Philpott, the perfect insect appears from October till January, and is very abundant amongst grass and low herbage. Unlike most other members of the genus it is not found in the forest.

BORKHAUSENIA PAULA.

(*Borkhauseniana paula*, Philp., Trans. N.Z. Inst., lvii., 707.)

(Plate LII., fig. 22 ♀.)

This rather distinct little species was discovered by Mr. S. Lindsay at Pukeatua Bush, on the Lyttelton Hills, near Christchurch.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather narrow with the apex acute; pale brownish-cream-colour without markings. The hind-wings are brown.

Described and figured from a specimen submitted by Mr. Philpott.

BORKHAUSENIA HORAEA.

(*Occophora horaea*, Meyr., Trans. N.Z. Inst., xvi., 40.)

This species has occurred at Hamilton and the Bealey River.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings are whitish-ochreous, rather suffused with yellowish-ochreous, costal margin yellowish-ochreous; costa suffusedly blackish towards base; a few blackish scales on fold at $\frac{1}{2}$, on costa in middle and at $\frac{3}{4}$, and above tornus; posterior half of wing more or less irrorated very finely with fuscous; cilia pale yellowish-ochreous, irrorated with fuscous points, especially on tips round apex, and on a spot at tornus. Hind-wings grey; cilia whitish-grey.

Differs from all the other yellow species in its distinct ochreous tint, especially on costa and cilia; not very close to any other.

The perfect insect appears in January.

I am unacquainted with this species. The above is taken from the original description.

BORKHAUSENIA ANAEMA.

(*Occophora anaema*, Meyr., Trans. N.Z. Inst., xvi., 42.)

This species was discovered by Mr. Meyrick at Lake Wakatipu.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which have the apex blunt-pointed and the termen very obliquely rounded, are very pale whitish-ochreous, with fine scattered light brown scales; the basal third of the costa is broadly dark brown a short inwardly-oblique dark brown mark on the fold at $\frac{1}{2}$, sometimes obsolete; a cloudy oblique dark brown bar from disc beyond middle to tornus; cilia very pale whitish-ochreous with lines of grey points, forming a broader dark grey shade before tips. The hind-wings are grey, darker towards the termen.

Separable from all its immediate allies by the dark brown suffusion of the head as well as of the entire thorax except a small lateral spot; the fore-wings have a peculiar dull appearance, due to the fine brown irroration, which is only perceptible under a lens.

The perfect insect appears in December.

I am unacquainted with this species. The above is taken from the original description.

BORKHAUSENIA APANTHES.

(*Occophora apantes*, Meyr., Trans. N.Z. Inst., xvi., 41.)

(Plate XXIX., fig. 10.)

This species has occurred at Hamilton, Cambridge and Wellington in the North Island.

The expansion of the wings is about $\frac{1}{2}$ inch. The thorax is pale whitish-ochreous with an oblong dark brown spot on each shoulder not touching lateral margin. The fore-wings are pale whitish-ochreous slightly suffused with pale yellow; basal third of costa broadly dark brown; a dark brown dot in disc before middle, a second beyond middle and a third on fold, first and third sometimes obsolete; sometimes a bar of scattered dark brown scales between second dot and tornus; some scattered brown scales at apex and towards termen. The hindwings are whitish-grey.

The perfect insect appears from the end of October until the end of December. It often occurs commonly amongst manuka scrub (*Leptospermum*), and its colouring and general appearance probably imitates a faded manuka leaf.

BORKHAUSENIA MACARELLA.

(*Occophora macarella*, Meyr., Trans. N.Z. Inst., xvi., 43.)

This species has occurred at Christchurch.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale yellow, somewhat suffused with deeper yellow; costa dark fuscous towards base; sometimes a few dark fuscous scales on fold at $\frac{1}{2}$, and on a bar from disc to tornus. The hind-wings are whitish-grey.

Stated to be readily known by the pale yellow colouring, the less defined basal mark on costa, and the almost wholly dark fuscous thorax.

The perfect insect appears in January.

I am unacquainted with this species. The above is taken from the original description.

BORKHAUSENIA ARMIGERELLA.

(*Oecophora armigerella*, Walk., Cat. xxix., 698; Meyr., Trans. N.Z. Inst., xvi., 41; *Borkhausenia actinias*, Meyr., Trans. Ent. Soc. Lond. 1901, 574.)

(Plate XXIX., figs. 11, 12 varieties.)

This bright yellow species seems to be common and generally distributed throughout the country.

The expansion of the wings is rather under $\frac{3}{4}$ inch. The fore-wings are rather deep yellow with the basal fourth of the costa strongly margined with dark brown; there is sometimes a blackish discal dot on the fold and another at $\frac{3}{4}$, and rarely a broad dusky grey streak from the outer discal dot to the tornus, in which case the cilia are barred with blackish-brown at the apex and tornus (see fig. 12). The hind-wings are grey.

There is much variation in the blackish-grey markings on the fore-wings, which are very often altogether absent. The fore-wings also vary considerably in the depth of the yellow ground colour, which is duller and more ochreous in some specimens than in others.

The perfect insect appears from November till January. It is often found resting on tree trunks, or fences, and when disturbed suddenly falls to the ground, where it either lies on its back with closed wings, or secretes itself in some crevice.

BORKHAUSENIA PHARMACTIS.

(*Borkhausenia pharmactis*, Meyr., Trans. Ent. Soc. Lond., 1905, 241.)

(Plate L., fig. 26 ♀.)

This species was discovered by Mr. Meyrick on the Mount Arthur Tableland, at an elevation of about 4,000 feet above the sea-level. It has since been taken by Mr. Philpott in the Cobb Valley.

The expansion of the wings is $\frac{3}{4}$ inch. It is extremely similar to *Borkhausenia apertella*, but shorter-winged and the outer portions of the fore-wings are densely sprinkled with reddish-brown scales. Mr. Philpott states that the structure of the male terminal appendages entitles this form to specific rank.

The perfect insect appears in December.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

BORKHAUSENIA FRETATA.

(*Borkhausenia fretata*, Philp., Trans. N.Z. Inst., lvi., 402.)

(Plate XLVI., fig. 2 ♂.)

This insect was taken by Mr. Philpott at Nelson.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. It differs from the ordinary form of *Borkhausenia apantes* in having the head, anterior portions of thorax and extreme base of costa, blackish-brown; the fore-wings are also deeper yellow. Mr. Philpott states that the terminal appendages of the male also exhibit differences from allied forms.

The perfect insect appears in November.

Described and figured from a specimen in Mr. Philpott's collection.

BORKHAUSENIA APERTELLA.

(*Oecophora apertella*, Walk., Cat. xxix., 698; *bifaciella*, ibid. 810; *Oecophora oporaca*, Meyr., Trans. N.Z. Inst., xvi., 40.)

(Plate XXIX., figs. 19, 20 varieties.)

This large, very vivid yellow species has occurred in the North Island on Mount Ruapehu and at Wainui-o-mata near Wellington, and in the South Island on Mount Arthur, Castle Hill, Lake Wakatipu and Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are very deep rich yellow, sometimes clouded with orange-brown; there is a fine blackish line along the costa at the base; two discal dots at $\frac{1}{4}$, often absent, and one at $\frac{3}{4}$, usually very small or absent. The hind-wings are grey.

The perfect insect appears in November and December, and in elevated situations is found until the middle or end of January. It is often very common in beech* forests at elevations of about 2000 feet, and when resting on the ground with closed wings it is very like a yellow beech leaf. Mr. Philpott informs me that specimens from the extreme south often exhibit an orange-brown angulated sub-terminal line.

BORKHAUSENIA ERIPHAEA.

(*Borkhausenia eriphaca*, Meyr., Trans. N.Z. Inst., xvi., 107.)

(Plate XXXVIII., fig. 15 ♀.)

This very obscure species was discovered by Mr. Philpott on Ben Lomond, Lake Wakatipu, at an altitude of about 2,500 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather narrow, with the apex pointed and the termen oblique; dull reddish-ochreous, sometimes tinged with lilac or grey, but without distinct markings; the costa is faintly shaded with grey towards the base. The hind-wings are grey, very slightly tinged with reddish-ochreous; the cilia are pale grey, whitish on the costa.

The perfect insect appears in November, and is found in beech forests on the mountain side. It is allied to *B. perichlora*.

BORKHAUSENIA PERICHLORA.

(*Borkhausenia perichlora*, Meyr., Trans. N.Z. Inst., xxxix., 118.)

(Plate XXIX., fig. 14.)

This rather large dull-coloured species was discovered at Invercargill by Mr. Philpott. It has also occurred on the Hunter Mountains.

The expansion of the wings varies from $\frac{1}{2}$ to $\frac{3}{4}$ inch. The fore-wings are rather elongate with the termen very obliquely rounded; dull ochreous-brown, generally strongly tinged with brick red; there is an indistinct wavy yellowish streak along the dorsum; an oblique brown mark on the fold; an obscure discal dot at $\frac{3}{4}$ and a very obscure curved sub-terminal line. The hind-wings are greyish-ochreous with the cilia much paler. The head and palpi are dull greyish-brown.

There is considerable variation in the markings, which are sometimes almost obsolete.

The perfect insect appears from October to January, and is very common amongst manuka scrub (*Leptospermum*). In general appearance it is somewhat intermediate between *B. basella* and *Leptocroca scholaea*.

**Nothofagus Solandri*.

BORKHAUSENIA OPACA.

(*Borkhausenia opaca*, Philp., Trans. N.Z. Inst., lvi., 403.)

(Plate XXIX., fig. 15 ♀.)

This species was discovered by Mr. Philpott at Tisbury near Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are brownish-ochreous, much paler on the dorsum, heavily sprinkled with bright reddish-orange scales in the disc and on the fold; there is a conspicuous black spot on the fold at about $\frac{1}{3}$; a broad blackish bar on the tornus and a very indistinct subterminal line; the cilia are brownish-ochreous mixed with yellow and orange-red, with a conspicuous blackish bar from the tornal mark. The hind-wings are brownish-grey, with very strong bronzy reflections.

An obscure species, principally characterized by the peculiar tornal mark, and heavy sprinkling of orange-red scales.

The perfect insect appears in December.

Described and figured from Mr. Philpott's specimen.

BORKHAUSENIA PHEGOPHYLLA.

(*Oecophora phegophylla*, Meyr., Trans. N.Z. Inst., xvi., 39.)

(Plate XXXVIII., fig. 9.)

This rather bright-looking species, which is evidently very closely allied to *Borkhausenia basella*, has occurred at Lake Wakatipu and on the Lake Harris track, Routeburn Valley, beyond Lake Wakatipu.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are deep orange-brown darker towards the dorsum; there is a conspicuous wavy yellowish streak along the dorsum, often edged with reddish-orange, and nearly interrupted in the middle by a rounded projection of the brown ground colour. The hind-wings are grey.

The perfect insect appears in December, and frequents beech forests. Its colouring closely resembles that of a dead beech leaf.

Described and figured from a specimen kindly lent to me by Mr. F. S. Oliver. There is some doubt as to the correct identification of this form.

BORKHAUSENIA BASELLA.

(*Incurvaria basella*, Walk., Cat. xxviii., 492; *Oecophora ademptella*, Walk., Cat. xxix., 698; *Borkhausenia basella*, Meyr., Trans. N.Z. Inst., xxxix., 118.)

(Plate XXIX., fig. 25 ♂, 26 ♀; Frontispiece, fig. 28 portion of egg-mass.)

This rather large species has occurred at Kaitoke, Wellington, the Otira River, Blue Cliff and Invercargill.

The expansion of the wings is considerably over $\frac{1}{2}$ inch. The fore-wings of the male are uniform brown with a wavy yellow streak along the dorsum. The hind-wings are grey. In the female the fore-wings are pale brownish-yellow variegated with warm brown; there is a clear yellow wavy streak along the dorsum, often broadly bordered with dark brown near the middle; there are usually one or two discal dots and a wavy subterminal line. The hind-wings are grey.

In some male specimens the fore-wings are greyish-brown, in others a warmer brown tinged with yellow. The depth of the grey of the hind-wings also varies. In the

female the extent of the brown mottling on the fore-wings is very variable, and in some specimens almost absent.

The perfect insect, which frequents light forests and scrub, appears towards the end of October and is extremely abundant during November, but is seldom met with later than the first week in December. It becomes very rapidly worn and is always difficult to obtain in good condition. When disturbed it drops to the ground, where it is very hard to find amongst the dead leaves and other refuse. The male occasionally flies and its dark colour makes it very inconspicuous when on the wing. The female appears to be a very sluggish insect. I have taken both sexes in great abundance amongst the faded flowers of the wharangi (*Brachyglottis repanda*). Mr. Philpott states it is a rare species in the far south. The eggs of this insect are deposited singly or in masses. They are sub-cylindrical, much flattened, often partially collapsed, with rows of extremely indistinct hexagonal depressions; dull white with faint iridescent reflections.

BORKHAUSENIA AMICULATA.

(*Borkhausenia amiculata*, Philp., Trans. N.Z. Inst., lvi., 402.)

This species, which was discovered by Mr. Philpott at the Cobb Valley, Nelson, and has occurred on the Mount Arthur Tableland and at Arthur's Pass, very closely resembles the male of *Borkhausenia basella*, but the apex of the fore-wings is more pointed. Mr. Philpott states that there are structural differences in the terminal appendages of the male which entitle it to specific rank. In this form the differences between the sexes, usually associated with *B. basella*, are absent.

The perfect insect occurs in December, and is found amongst veronicas and other shrubs.

BORKHAUSENIA POLITIS.

(*Oecophora politis*, Meyr., Trans. N.Z. Inst., xx., 81.)

(Plate XXIX., fig. 24.)

This species, which is very closely allied to *B. basella*, has occurred at Wellington and at Dunedin.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which are rather broad with the termen oblique and almost straight, are pale brown very thickly speckled and clouded with darker brown; there is a broad wavy yellow-ochreous streak along the dorsum to about $\frac{1}{3}$; a very conspicuous oblique black mark on the fold almost crossing the yellow streak; the two other discal dots are faintly indicated; there is a faint wavy subterminal line. The hind-wings are brownish-grey.

The perfect insect appears in October and November, and is very common amongst scrub but is soon past. It occurs in company with *B. basella*, which it very closely resembles. It is, however, slightly smaller. The dark markings on the fore-wings are plainer than in the male of *B. basella*, which is almost uniform deep brown. It is also less mottled and darker than the female *basella*. According to Mr. Meyrick the antennal ciliations are shorter in the male of *basella* than in the male of *politis*.

BORKHAUSENIA IDIOGAMA.

(Borkhausenia idiogama, Meyr., Trans. N.Z. Inst., lv., 661.)

(Plate XXIX., fig. 31 ♀.)

This very dull-looking species has occurred on the lower slopes of Mount Egmont.

The expansion of the wings is nine-sixteenths of an inch. The fore-wings are *dull bronzy-grey*, in female paler towards the apex; there is a blackish spot on the fold at about $\frac{1}{2}$ and another in the disc beyond the middle, continued as an obscure bar as far as tornus. The hind-wings are *blackish-grey* with slight bronzy reflections.

Apparently variable in respect of the distinctness of the discal markings.

The perfect insect appears in January and may be looked for in sub-alpine scrub about 3,500 feet above sea-level.

BORKHAUSENIA PRONEPHELA.

(Borkhausenia pronepela, Meyr., Trans. N.Z. Inst., xxxix., 119.)

(Plate XXIX., fig. 28.)

This rather sharply-marked and distinct species was discovered at Invercargill by Mr. Philpott. It has also occurred at Bluecliff.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are *brownish-ochreous irregularly clouded with dark brownish-grey especially towards the base*; there is a very conspicuous wavy pale yellow streak along the dorsum, partially edged with white and containing a well-defined blackish spot before the middle; a rather conspicuous discal dot is situated beyond the middle of the wing, and an obscure wavy transverse line extends from the costa before the apex to the tornus. The hind-wings are pale grey. The head and thorax are yellowish. The palpi are yellow with the lower half of the second joint dark brown.

The perfect insect appears from October till February, and frequents the outskirts of the forest.

BORKHAUSENIA CHLORADELPHA.

(Borkhausenia chloradelpa, Meyr., Trans. Ent. Soc. Lond., 1905, 239.)

(Plate XXX., fig. 4; Plate III., fig. 29 larva.)

This pale-coloured but distinct species is very common in the neighbourhood of Wellington. It has also occurred at Christchurch and Dunedin.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings, which are rather elongate with the termen very oblique, are *pale whitish-ochreous with a brownish-ochreous shading along the fold, a wavy longitudinal band along the dorsum being nearly white*; there is a rather elongate discal dot on the fold at about $\frac{1}{4}$, another in the disc slightly beyond it, and a third at about $\frac{3}{4}$; there is often a sprinkling of brown scales just before the termen. The hind-wings are very pale whitish-ochreous with a faint grey discal dot.

There is considerable variation in the depth of the ground colour and in the intensity of the discal dots which are sometimes absent.

The larva, which was discovered by Mr. R. M. Sunley, is about $\frac{3}{4}$ inch in length. The head is very small blackish-brown and horny; the second segment is also entirely

horny and very much constricted behind; the third segment has two large horny plates and the fourth segment four very minute ones; the rest of the body is very stout, soft, dull blackish-brown with a darker dorsal line. Each segment has at least four distinct oblong pale patches, each patch having in its centre a minute horny wart. This larva lives through the winter. It is subterranean in its habits, feeding on the roots of grass amongst which it constructs numerous silken tubes.

The pupa is enclosed in a frail white silken cocoon situated in one of the burrows formed by the larva.

The perfect insect appears in October and is common until the end of December. It frequents gardens and other cultivated places, very frequently entering houses. It is extremely abundant at Karori, where it is constantly seen resting on window panes.

BORKHAUSENIA HASTATA.

(Borkhausenia hastata, Philp., Trans. N.Z. Inst., xlviii., 422.)

(Plate XXX., fig. 5.)

This very distinct species was discovered by Mr. Philpott at Seaward Moss, near Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather elongate with the apex acute and the termen very oblique; pale whitish-ochreous faintly tinged with grey except on the dorsum; there is a faint blackish streak on the fold; a distinct black discal spot and a series of black terminal dots. The hind-wings are very pale greyish-white.

This species closely resembles *Borkhausenia chloradelpa*, but may be easily distinguished from that insect by its much narrower and more pointed fore-wings, greyer colouring and darker terminal and discal dots. The whitish-ochreous dorsal band in *B. chloradelpa* is also much broader and its upper outline is distinctly notched.

The perfect insect appears in October. It is apparently very rarely met with.

Described and figured from a specimen in Mr. Philpott's collection.

BORKHAUSENIA VESTITA.

(Borkhausenia vestita, Philp., Trans. N.Z. Inst., lvi., 392.)

(Plate LI., fig. 4 ♂.)

This rather stout-looking species was discovered by Mr. S. Lindsay, on the Hunter Mountains.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are dull ochreous, more or less sprinkled with blackish scales; there is a broad irregular pale ochreous patch, extending from base to tornus and occupying the whole of the plical region; a conspicuous black spot on the fold, and two others above this; a black shading along costa near base, and an obscure, strongly sinuate sub-terminal line; the cilia are pale brown, mixed with ochreous. The hind-wings and cilia are blackish-brown. The head is bright ochreous, and the body ochreous-brown.

The perfect insect appears in January.

Described and figured from a specimen submitted by Mr. Philpott.

BORKHAUSENIA SIDEROTA.

(*Cremnogenes siderota*, Meyr., Trans. N.Z. Inst., xx., 82.)

(Plate XXIX., fig. 27.)

This very rare and local species was discovered by Mr. Meyrick on Mt. Arthur at an elevation of about 4,500 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are dark brownish-grey with rich orange-brown markings more or less distinctly margined with metallic silver; there is a yellow patch on the dorsum at the base; two pale metallic angulated transverse lines at about $\frac{1}{4}$; a dark brown transverse band at about $\frac{1}{4}$, containing a very dark spot on the fold; a broad costal bar of orange-brown near the middle; a large metallic-edged round spot beyond this, followed by a broad sub-terminal band; the dorsum and the cilia are more or less clouded with yellow. The hind-wings are dark brown, darker towards the termen.

The perfect insect appeared in January, and was abundant on the flowers of *Aciphylla* within a limited locality.

Described and figured from a damaged specimen in the Fereday collection.

BORKHAUSENIA EPICALCA.

(*Cremnogenes epicalca*, Meyr., Proc. Linn. Soc. N.S.W., 1885, 793.)

(Plate XXXVIII., fig. 7 ♂.)

This rather dull-coloured but very distinct species has occurred on Arthur's Pass and on the mountains around Otira at elevations of about 3,000 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-oval with the termen very obliquely rounded; dark greyish-ochreous and very glossy, sometimes very slightly tinged with reddish; there are no markings. The hind-wings are darker and browner than the fore-wings. The antennae are long, stout, with long cilia arranged in whorls.

Varies considerably in the depth of colouring.

The perfect insect appears in January, frequenting rough alpine vegetation, on the edges of scree, on the mountain side, between 3,000 and 4,000 feet.

BORKHAUSENIA APHRONTIS.

(*Cremnogenes aphrontis*, Meyr., Trans. N.Z. Inst., xvi., 46.)

(Plate XXXVIII., fig. 22 ♂.)

This rather bright-looking speckled yellow species has occurred on Mount Arthur and on Arthur's Pass at elevations of about 4,000 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-oval with the termen very obliquely rounded, leaden-grey densely clothed with deep yellow scales; there are several very irregular leaden-grey patches on the basal third, a ring-shaped mark in the disc and a sub-terminal line; the usual three stigmata are plainly indicated by patches of three or four black scales. The hind-wings are dark brown speckled with blackish. The palpi are very long with the middle joint yellow and the apical joint black. The antennae are stout black.

Variable in the extent of the lead-coloured patches which in some specimens appear to be almost absent.

The perfect insect appears in January. It is found on open country, amongst rough alpine vegetation, between 3,000 and 5,000 feet.

BORKHAUSENIA OXYINA.

(*Cremnogenes oxyina*, Meyr., Trans. N.Z. Inst., xvi., 45.)

(Plate XLVI., fig. 6 ♀.)

This rather dull, rusty-looking species was discovered by Mr. Meyrick at Lake Wakatipu in December, 1882. More recently it has occurred on Ben Lomond and at Greenhills, near Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather pale dull brown very thickly speckled with deep red scales; there are dark brown spots on the fold and in the disc beyond the middle and sometimes an indented ochreous-whitish streak along the dorsum from the base to $\frac{3}{4}$. The hind-wings are greyish-brown.

The perfect insect has been found very commonly amongst *Nothofagus Solandri* at elevations of from 1,000 to 3,000 feet above the sea-level. At Greenhills Mr. Philpott found it abundantly amongst *Leptospermum*. It is evidently a very local insect.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

BORKHAUSENIA MONODONTA.

(*Cremnogenes monodonta*, Meyr., Trans. N.Z. Inst., xliii., 75;*Cremnogenes nigra*, Philp., Trans. N.Z. Inst., xlvii., 120.)

(Plate XXXVIII., fig. 10 ♂.)

This rather dull-looking species was discovered on Mount Holdsworth by Mr. R. M. Sunley and has since been found on Mt. Arthur, Arthur's Pass and the mountains around Lake Wakatipu.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings, which are rather elongate with the apex obtuse and the termen very obliquely rounded, are dark brownish-black with bronzy reflections; there is a whitish-ochreous elongate mark on the fold near the middle of the wing and a cloudy pale ochreous band along the dorsum. The hind-wings are dark brownish-black with bronzy reflections. The antennal ciliations, which are very conspicuous, are four times the breadth of the stalk and whorled.

The perfect insect appears in November and December, frequenting beech* forests, at elevations of from 2,500 to 3,000 feet above the sea-level.

BORKHAUSENIA AFFLICTA.

(*Borkhausenina afflicta*, Philp., Trans., N.Z. Inst., lvi., 401.)

This species was discovered by Mr. Philpott on the Dun Mountain, near Nelson, at an elevation of about 2,000 feet above the sea-level.

Extremely similar to *Borkhausenina monodonta*, from which it is stated to differ in less dilated fore-wings and shorter antennal ciliations of the male.

**Nothofagus Solandri*.

BORKHAUSENIA THALERODES.

(*Borkhausenia thalerodes*, Meyr., Trans. N.Z. Inst., xlviii., 416.)

(Plate XXXVIII., fig. 11 ♂.)

This bright-looking species has occurred on Arthur's Pass at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are bright orange-brown with a rather indefinite oblique whitish mark on the dorsum near the tornus reaching the fold. The hind-wings are deep brownish-black.

The perfect insect appears in January, and frequents rough herbage on the mountain side.

BORKHAUSENIA ROBIGINOSA.

(*Cremnogenes robiginosa*, Philp., Trans. N.Z. Inst., xlvii., 200.)

(Plate XXIX., fig. 36 ♂.)

This insect, which but for its antennae has a deceptive resemblance to *Borkhausenia basella*, was discovered by Mr. Philpott on Longwood Range near Orepuki at an elevation of about 2,700 feet. It has also occurred on the Hunter Mountains.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are blackish-grey, very densely sprinkled with reddish-brown scales; there is a small orange-brown patch near the base and a much larger and paler patch near the middle of the dorsum, edged with whitish towards the disc. The hind-wings are grey. The antennae have long cilia arranged in whorls.

The perfect insect appears in December and January, and frequents sub-alpine scrub, composed of *Veronica* and *Cassinia*, at elevations between 2,500 and 3,500 feet above the sea-level.

Described and figured from a specimen in Mr. Philpott's collection.

BORKHAUSENIA NYCTERIS.

(*Occophora nycteris*, Meyr., Trans. N.Z. Inst., xxii., 219; *Borkhausenia nycteris*, ib., xliii., 63.)

(Plate XXIX., fig. 34 ♂, 35 ♀.)

This very dark-looking species has occurred at Wellington, Otira River, Wyndham, Riverton and Invercargill.

The expansion of the wings varies from about $\frac{1}{2}$ inch to slightly over $\frac{1}{2}$ inch. The fore-wings of the male are very dark bronzy-brown; there are three rather indistinct black discal dots; the first on the fold, the second before the middle and the third beyond the middle. The hind-wings are very dark grey. The female resembles a very dark specimen of *B. plagiatella*, except that the basal portions of the fore-wings are clouded with grey, and the central portions with rich yellowish-brown. The hind-wings are rather dark grey. In both sexes the second joint of the palpi is clothed with peculiar erect projecting scales and this character separates the species from any of the other members of the genus at present known.

There is considerable variation in the size of the male, specimens from the North Island being smaller and paler than those from the South Island.* The female varies in colour, some specimens being almost entirely brown like the male, and in these the paler variegated colouring is confined to the apical extremities of the fore-wings.

*It seems possible that the North Island form may ultimately prove to be a distinct species.

The perfect insect appears from October till January, and frequents open forests and scrub, where it is sometimes fairly common. Mr. Philpott informs me that in the Invercargill district it is found almost exclusively amongst manuka (*Leprospermum*) and is locally very abundant. He also states that specimens from the extreme south frequently show traces of a white sub-terminal line, dorsal streak and tornal band.

BORKHAUSENIA HOMODOXA.

(*Borkhausenia homodoxa*, Meyr., Trans. N.Z. Inst., xvi., 43.)

(Plate XLVII., fig. 14 ♂.)

This very dull-looking, but quite distinct species, is common on the lower slopes of Mount Aurum, near Skipper, Lake Wakatipu. It has also been found on Ben Lomond.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are very pale greyish-ochreous with a few scattered ochreous-brown scales in the disc; there is a very narrow triangular grey streak along the costa from the base to about $\frac{1}{2}$ heavily speckled with blackish-grey scales. The hind-wings are grey. The head, thorax and anterior legs are grey, heavily speckled with blackish-grey scales.

The perfect insect appears from November till January, and frequents open grassy country at an altitude of about 3,000 feet.

BORKHAUSENIA GRISEATA.

(*Occophora griseata*, Butl. Proc. Zool. Soc. Lond. 1877, 405.)

Wings and body above shining grey; primaries irrorated with brown, crossed by two widely separated indistinct oblique brown lines, the inner one angulated at the median nervure, the outer one, which is discal, deeply excavated in the middle; a spot of the same colour at the end of the cell; secondaries with a feeble brassy tinge; primaries below shining brown, fringe grey; secondaries sordid white, speckled with brown; body below pale brown; legs white internally. Expanse of wings 7 lines.

I am unacquainted with this species. The above is copied from the original description.

BORKHAUSENIA ANCOGRAMMA.

(*Borkhausenia ancoagramma*, Meyr., Trans. N.Z. Inst., li., 352.)

(Plate XLVII., fig. 6 ♀.)

This rather bright-looking little species has occurred at Porirua, near Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale brownish-ochreous with dark brown markings; there are two small dark brown marks near the base; a large patch placed obliquely on the middle of the fold; two conspicuous discal spots, the first round; the second somewhat crescentic; there are two faint brown patches on the costa and a cloudy patch on the termen; the whole wing is more or less strewn with scattered brownish scales except on a small dorsal area near the base; the cilia are pale brownish-ochreous. The hind-wings are pale greyish-ochreous; the cilia pale ochreous tinged with grey.

The perfect insect appears in February, and frequents open glades in scrubby forest.

BORKHAUSENIA INNOTELLA.

(*Oecophora innotella*, Walk., Cat. xxix., 652; *griseata*, Meyr., Trans. N.Z. Inst., xvi., 39.)

(Plate XXIX., fig. 21.)

This rather obscurely-marked species is generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings, which are dilated towards the termen, are pale ochreous-brown with darker brown markings; there is a rather broad wavy line from the dorsum at $\frac{1}{3}$ nearly reaching the first discal dot; the second discal dot is situated at about $\frac{2}{3}$ and is often connected with the tornus by an oblique line; there is a doubly curved sub-terminal line from the costa before the apex to the tornus. The hind-wings are grey.

There is considerable variation in the depth of the ground colour and also in the distinctness of the markings.

The perfect insect appears from December till March. It frequents open forests or scrub and is sometimes fairly common. Apparently it has a distinct preference for the silver tree fern (*Cyathea dealbata*.)

BORKHAUSENIA MARCIDA.

(*Borkhausenia marcida*, Philp., Trans. N.Z. Inst., lvii., 706.)

This very obscure form was found by Mr. S. Lindsay at Bottle Lake, near Christchurch. It has also occurred at Governor's Bay and Mount Grey, Canterbury.

It is very like some of the pale forms of *B. innotella*, from which it apparently differs in its peculiar opaque-looking whitish colouring, very indefinite brownish speckling and absence of any distinct sub-terminal line. Some specimens have no markings. Mr. Philpott considers that the differences in the terminal appendages of the male entitle this form to specific rank.

Described from a specimen lent by Mr. Philpott.

BORKHAUSENIA SERENA.

(*Borkhausenia serena*, Philp., Trans. N.Z. Inst., lvi., 403.)

(Plate LI., fig. 10 ♀.)

This species was discovered by Mr. Philpott, at Sunny-side, Southland.

The expansion of the wings is nine-sixteenths of an inch. The fore-wings are very pale ochreous, more or less densely strewn with brown scales; a broad longitudinal streak of deep brown scales on basal third of costa; a cluster of blackish-brown scales below middle of fold; a much less distinct patch above this near end of fold; a conspicuous streak of blackish-brown scales from disc to tornus; very large irregular patches of thinly strewn pale brown scales in disc, and along termen, the intervening spaces having a few isolated pale brown scales. The hind-wings are pale brownish-grey. The head, thorax and abdomen are brown, except two pale ochreous patches, one on each side of the anterior portion of the thorax.

The perfect insect appears in January.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

BORKHAUSENIA FENESTRATA.

(*Borkhausenia fenestrata*, Philp., Trans. N.Z. Inst., lvi., 404.)

This is a very obscure greyish-brown species, found by Mr. Philpott on the Dun Mountain, near Nelson, and stated

to be chiefly distinguished by the second discal spot, which has the lower half white. It is fairly common in forest, at altitudes of from 2,000 to 3,000 feet above sea-level. Expansion of wings $\frac{1}{2}$ inch.

BORKHAUSENIA BRACHYACMA.

(*Borkhausenia brachyacma*, Meyr., Trans. N.Z. Inst., xli., 13.)

(Plate XXIX., fig. 23 ♂.)

This is another very obscure, but distinct species, which was discovered at Invercargill by Mr. Philpott.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are whitish-ochreous densely speckled with brown; there is an obscure brownish patch on the dorsum near the base limited by a fine inwardly oblique blackish line; a rather conspicuous spot on the fold; a very large brown discal spot at $\frac{2}{3}$; a small patch on the dorsum just before the tornus and a wavy sub-terminal line. The hind-wings are pale grey. The terminal joint of the palpi is very short and the antennae are pubescent-ciliated.

The perfect insect appears in October and November, and is common amongst manuka (*Leptospermum*) and other shrubs. It also occurs in forests and open swamps. In general appearance it is very similar to *B. innotella*, but may be distinguished by the special characters italicised in the above description.

BORKHAUSENIA PENTHALEA.

(*Borkhausenia penthalca*, Meyr., Trans. Ent. Soc. Lond. 1905, 239.)

(Plate XXIX., fig. 13 ♂.)

This rather distinctly-marked species has occurred in the neighbourhood of Wellington and at Mangatariri River, Taranaki Range.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are creamy-white more or less speckled with pale brown, especially towards the base and costa; there is an oblique brown mark on the fold at $\frac{1}{3}$, a minute discal dot above it and a larger discal dot at $\frac{2}{3}$; a very large irregular dark brown patch extends from a little before the apex almost to the tornus, leaving a narrow terminal band of the ground colour; the cilia are dull white. The hind-wings are pale grey, darker towards the termen.

There is considerable variation in the brown patch on the fore-wings, which is occasionally divided into two distinct spots. The ground colour also varies, being much whiter in some specimens than in others; the discal dots are sometimes clouded with orange-brown.

The perfect insect appears from December till February, and frequents forests. It is a rare species.

BORKHAUSENIA AMNOPIS.

(*Borkhausenia amnopis*, Meyr., Trans. N.Z. Inst., xlii., 65; *ibid.* xliii., 65.)

(Plate XXIX., fig. 33.)

This rather pretty variegated species was discovered by Mr. Philpott at Invercargill. It has also occurred at Mataura.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate with the termen oblique; the basal half is pale purplish-grey spotted and speckled with black, especially at its edges and on the fold; the apical half is rather bright ochreous-yellow; there is a small pale ochreous patch on the dorsum at the base; a fine strongly-indented blackish sub-terminal line and a pale grey sub-apical patch. The hind-wings are pale ochreous, tinged with grey towards the apex and termen.

The perfect insect appears from October till December, and frequents forest.

Described and figured from a specimen in Mr. Philpott's collection.

BORKHAUSENIA PLAGIATELLA.

(*Tinea plagiella*, Walk., Cat., xxviii., 485; *Gelechia contextella*, ib., xxix., 656; *Borkhausenia plagiella*, Meyr., Trans. N.Z. Inst., xliii., 64; *Borkhausenia crotala*, Meyr., ib. xlvii., 213.)

(Plate LI., fig. 5 ♂ typical form; 6 pale variety ♂; 7 dark variety ♀.)

This pretty, variegated species is probably common and generally distributed throughout the country.

The expansion of the wings varies from slightly under $\frac{1}{2}$ inch to slightly under $\frac{3}{4}$ inch. The fore-wings are white more or less clouded with yellow; there are five brownish-grey or black-speckled patches on the costa; the first and largest at the base, reaching across the fold, the second before the middle, the third beyond the middle, the fourth before the apex, emitting a fine wavy line which nearly reaches to the tornus, the fifth is situated on the cilia at the apex; there is an irregular grey mark on the fold and two distinct discal dots at $\frac{1}{2}$ and $\frac{3}{4}$, often centred with yellow, or yellowish-brown; a yellowish-brown blotch from disc to tornus and two grey blotches on the dorsum. The hind-wings are pale grey.

There is great variation in the extent and depth of both the yellow clouding and the grey markings, many of which are often obsolete; also in the depth of the colouring of the hind-wings.

A rather large, pale coloured variety of this species is common on the lower slopes of Mounts Egmont and Ruapehu, about 4,000 feet above sea-level. Forms heavily suffused with black are also occasionally met with in the same localities. (See Plate LI., figs. 6 and 7.)

The perfect insect appears from November until January, and is very common amongst light forest or scrub. When resting it stands on all its feet, the fore-legs being placed forwards, the intermediate pair outwards, and the hind-legs backwards and close to the body. The antennae are held backwards in contact with the wings, the wings themselves being folded over the body, like the roof of a house.

This species often occurs abundantly in gardens and plantations, where it seems to have a great liking for the foliage of *Pinus insignis* and *Cupressus macrocarpa*.

The form known as *Borkhausenia crotala*, Meyr., is stated to be distinguished by the absence of any yellow colouring.

BORKHAUSENIA HEMIMOCCLA.

(*Occophora hemimoccla*, Meyr., Trans. N.Z. Inst., xvi., 38.)
(Plate XXIX., fig. 32 ♂.)

This species has occurred in the North Island at Hamilton, Cambridge, Napier and Wellington.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are pale ochreous-grey thickly strewn with slightly darker greyish scales; there is an ill-defined longitudinal white streak below the costa, extending from near base to apex, and a narrow incomplete whitish sub-terminal line; an oblique blackish-brown mark on dorsum at $\frac{1}{2}$; a cluster of blackish-brown scales in disc above this; a similar but larger cluster in disc at $\frac{3}{4}$; an almost clear pale ochreous patch beyond this; there are several scattered blackish-brown scales around this patch and towards the apex and tornus; the cilia are pale greyish-ochreous with a few scattered blackish-brown scales. The hind-wings are pale brownish-ochreous; the cilia are pale ochreous.

The perfect insect appears from December till March.

BORKHAUSENIA SECLUSA.

(*Borkhausenia seclusa*, Philp., Trans. N.Z. Inst., lili., 340.)
(Plate XXIX., fig. 16 ♂.)

This obscure-looking, but distinct species has occurred on Ben Lomond, Lake Wakatipu and at Lake Luna at elevations between 1500 and 2000 feet above sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are dull whitish with ill-defined patches of blackish-grey and pale brown scales; the basal area near the costa is strongly clouded with blackish-grey; there is a patch of brown scales on the costa near the middle, another beyond the middle, another at the apex and a much more extensive patch near the tornus; two rather well-defined spots composed of black scales are situated in the disc and there are two oblique black marks on the dorsum, one near the middle and the other before the tornus; a well-marked wavy black sub-terminal line extends from the costa at about $\frac{1}{4}$ and loses itself in the tornal blotch; beyond this line and on most of the dorsum there are irregular confluent patches of pearly-white scales; the cilia are pale grey, clouded with blackish-grey at the apex and tornus. The hind-wings and cilia are greyish-white, speckled with darker towards the apex.

"Nearest to *B. crotala*, Meyr., but greyer than that species and without any ochreous admixture. The hind-wings are also darker."

The perfect insect appears in December.

Described and figured from a specimen kindly supplied by Mr. Philpott.

BORKHAUSENIA MOROSA.

(*Borkhausenia morosa*, Philp., Trans. N.Z. Inst., lvi., 403.)

This species was taken by Mr. Philpott at Nelson.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. It is considerably darker in colour than either *Borkhausenia plagiella* or *B. crotala*, with less white on the fore-wings. According to Mr. Philpott it differs from all other closely allied forms in the structure of the terminal appendages of the male.

The perfect insect appears in December.

Described from a specimen in Mr. Philpott's collection.

BORKHAUSENIA EPIMYLIA.

(*Oecophora epimylia*, Meyr., Trans. N.Z. Inst., xvi., 36.)

(Plate XXIX., fig. 29 ♂.)

This pretty little variegated species has occurred on the Taranui Range in the North Island, and at Nelson, Castle Hill, Bealey River and Lake Wakatipu in the South Island.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are yellowish-grey speckled and mottled with darker grey tending to form cloudy indistinct patches on the costa at $\frac{1}{4}$, the middle and $\frac{3}{4}$; a cloudy spot is situated on the fold at $\frac{1}{4}$, another before the middle and a third beyond the middle; there is a cloudy spot on the tornus; all these markings are indistinct, and some may be absent. The hind-wings are pale grey.

Mr. Meyrick points out that this species is "nearly allied to *B. plagiata*, having a similar mottled appearance, but readily known by its smaller size, slightly narrower wings, general grey tints and especially the grey head."

The perfect insect appears in January. It frequents beech* forests at elevations of from 1500 to 2500 feet above the sea-level, and in these situations is sometimes extremely abundant.

BORKHAUSENIA PALLIDULA.

(*Borkhausenia pallidula*, Philp., Trans. N.Z. Inst., lv., 210.)

(Plate L., fig. 9 ♂.)

This extremely pale-looking species was discovered by Mr. Philpott on the Goulard Downs, near Nelson.

The expansion of the wings is $\frac{1}{2}$ inch. All the wings are almost white. The fore-wings are strewn with very pale grey scales; there are two indistinct wavy transverse lines formed by irregular streams of blackish scales on the outer half of the fore-wings; the three stigmata are more or less distinctly indicated by small patches of blackish scales and the apical area is sprinkled with blackish-grey scales.

The perfect insect appears in February.

BORKHAUSENIA CHLORITIS.

(*Oecophora chloritis*, Meyr., Trans. N.Z. Inst., xvi., 36.)

A single specimen of this species was captured by Mr. Meyrick at Lake Wakatipu.

The expansion of the wings is about $\frac{3}{4}$ inch. The thorax is dark fuscous, posterior margin whitish-yellowish. The fore-wings are pale dull whitish-yellow; base of costa suffusedly dark fuscous; a very oblique indistinct grey streak from near costa at $\frac{1}{4}$ to middle of fold; a blackish dot below fold a little before extremity of this streak; a cloudy dark grey transverse mark on tornus; a faint greyish posterior suffusion, indicating a transverse line near termen. The hind-wings are grey.

Differs from all the other yellow species in the more elongate fore-wings and the transverse anterior and submarginal grey lines.

The perfect insect appears in December.

I am unacquainted with this species. The above is taken from the original description.

**Nothofagus Solandri*.

BORKHAUSENIA LETHARGA.

(*Borkhausenia letharga*, Meyr., Trans. N.Z. Inst., xvi., 35.)

(Plate LII., fig. 3 ♂.)

This pale-looking species has occurred at Dunedin and Ida Valley.

The fore-wings are elongate, with the apex rounded and the termen oblique; greyish-white, very heavily sprinkled with brown scales, except on basal area; a pale centred spot on fold at $\frac{1}{4}$ and another above and slightly beyond this; a third pale centred spot in disc beyond middle; there are traces of a series of dark marks along apical third of costa and on termen; the cilia are ochreous-grey. The hind-wings are elongate-oval with the apex rounded, pale brownish-grey, darker towards apex; the cilia are pale brownish-grey.

The perfect insect appears in December.

BORKHAUSENIA PSEUDOSPRETTELLA.

(*Oecophora pseudospretella*, Stt., Cat. Brit. Tin., 14; Meyr., Trans. N.Z. Inst., xvi., 34.)

(Plate XXX., fig. 7 ♂.)

This well-known and destructive species, which has been introduced by man, is now common and generally distributed throughout the country and is also found on the Chatham Islands.

The expansion of the wings varies from about $\frac{3}{4}$ inch to slightly over 1 inch. The fore-wings are dull ochreous-brown more or less speckled with dull black; there is a small black spot on the costa at the base; three black dots forming an elongate triangle in the middle of the wing and a series of elongate marginal dots from $\frac{3}{4}$ of the costa to the apex and thence along the termen to the tornus. The hind-wings are dull ochreous.

The larva feeds in silken galleries amongst woollen clothing, seeds, skins, dried insects, etc., and may commit most serious depredations in a museum. It is also very destructive amongst carpets, etc.

The perfect insect appears from December till March, and is common in many houses. It is not specifically allied to any of the native species.

Genus 4.—LEPTOCROCA. Meyr.

Head with appressed scales, side-tufts roughly spreading; ocelli posterior; tongue developed. Antennae $\frac{3}{4}$, in ♂ moderately or strongly ciliated ($\frac{1}{2}$), basal joint elongate, with pecten. Labial palpi long or very long, recurved, second joint reaching or exceeding base of antennae, thickened with appressed or loose scales, terminal joint as long as second or shorter, moderate, acute. Maxillary palpi very short, filiform, appressed to tongue. Posterior tibiae clothed with hairs above. Fore-wings with 15 furcate, 2 and 3 connate or stalked from angle, 7 and 8 stalked, 7 to costa, 11 from middle. Hind-wings 1, elongate-ovate, cilia $\frac{1}{2}$; 3 and 4 connate, 5-7 nearly parallel.

An Australian genus, containing four New Zealand species, all very obscure forms and extremely difficult to discriminate.

LEPTOCROCA SCHOLAEAE.

(*Oecophora scholaeae*, Meyr., Trans. N.Z. Inst., xvi., 35.)

(Plate XXIX., fig. 18 ♀.)

This very dull-looking inconspicuous species is probably common and generally distributed throughout the country.

The expansion of the wings varies from $\frac{1}{2}$ inch to a little under 1 inch. The fore-wings, which have the termen very obliquely rounded, vary from dull grey to dull ochreous brown with darker brown markings; there is a small spot on the costa at the base; a larger spot at $\frac{1}{2}$, and another spot near the middle; a dark brown discal dot at $\frac{3}{4}$, a second at $\frac{3}{4}$, and a third obliquely beyond the first on the fold; there is a very obscure wavy transverse line from the costa at $\frac{1}{2}$ to the tornus. The hind-wings are pale grey, darker towards the termen.

There is considerable variation in the ground colour, some specimens being more or less clouded with dull reddish-brown, or dark brown, and in these most of the markings are indistinct.

The larva is found in the dry earth underneath the roots of dead trees, where it constructs numerous tubes composed of silk and frass. It feeds on roots and other dry vegetable refuse. Its length when full-grown is slightly under 1 inch. The head and three succeeding segments are very small, the posterior portion of the second segment being much constricted; the rest of the body rapidly increases in stoutness, abruptly tapering just before the posterior extremity. The head is bright yellowish-brown and very shining, the second, third and fourth segments dull white with yellowish dorsal plates; the rest of the body is chocolate-brown with the lateral ridge and segmental divisions white. This larva, which is very sluggish, lives through the winter, pupation taking place in the early spring.

The perfect insect appears from November till February, and is often very common about midsummer. It frequents forests. When pursued it usually falls to the ground, where it is very inconspicuous. It is very quick in secreting itself in crevices, a habit which no doubt enables it to escape from many enemies.

LEPTOCROCA ASPHALTIS.

(*Borkhausenia asphaltis*, Meyr., Trans. N.Z. Inst., xliii., 65.)

(Plate XXIX., fig. 17 ♂.)

This very dull-coloured, obscure species was discovered by Mr. J. H. Lewis, probably in Central Otago. It has since occurred at Wellington and on Mount Aurum near Lake Wakatipu.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate with the apex obtuse and the termen very oblique; grey, densely speckled with darker grey; there are three small discal dots, one on the fold, one just above this and one beyond the middle; there is also a fairly distinct dark grey sub-terminal line. The hind-wings are grey.

Described and figured from a specimen in Mr. Philpott's collection.

LEPTOCROCA VARIABILIS.

(*Leptocroca variabilis*, Philp., Trans. N.Z. Inst., lvi., 394.)

This species is stated to be distinguished by the plical spot not being placed obliquely beyond the first discal, and differences in the structure of the genitalia. It was discovered by Mr. Philpott, in forest districts around Nelson.

LEPTOCROCA VACUA.

(*Leptocroca vacua*, Philp., Trans. N.Z. Inst., lvi., 393.)

Stated to be distinguished from *L. scholae* by its smaller size, greyish fore-wings, and structural differences in genitalia. It was discovered by Mr. Philpott at Nelson, and frequents forest.

Genus 5.—CHERSADAULA, Meyr.

Head loosely haired; ocelli posterior; tongue developed. Antennae $\frac{1}{2}$, in ♂ evenly ciliated, basal joint moderate, without pecten. Labial palpi rather long, recurved, second joint thickened with appressed scales, terminal joint about half second, slender, acute. Maxillary palpi very short, filiform. Posterior tibiae rough-scaled above. Fore-wings with vein 1b furcate, 2 and 3 stalked from angle, 7 and 8 stalked, 7 to costa, 11 from middle; in ♀ half-aborted, pointed. Hind-wings in ♂ 1, elongate-ovate, cilia $\frac{1}{2}$; 3 and 4 connate, 5-7 nearly parallel; in ♀ half-aborted, very short, lanceolate. (Plate G., figs. 13, 14, 15. Neuration and head of *Chersadaula ochrogastra* ♂.)

An interesting development of *Borkhausenia*.

Only one species is known at present.

CHERSADAULA OCHROGASTRA.

(*Chersadaula ochrogastra*, Meyr., Trans. N.Z. Inst., liv., 165.)

(Plate XLIX., fig. 12 ♂, 4 ♀.)

This species is probably fairly common along the sea-coast near Wellington, but at present it has only been obtained in the larval condition.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch, of the female barely $\frac{1}{2}$ inch. The fore-wings of the male are elongate-oval with the apex and tornus rounded, very dull greenish-ochreous more or less strongly tinged with reddish, especially towards the margins; the markings are composed of rather scattered black scales and consist of an irregular patch on the fold near the base, another patch towards middle of the dorsum, well-defined spots above and below the fold, a large round spot in the disc, a conspicuous tornal blotch, a sub-apical bar on costa and several indistinct marks along the termen. The hind-wings are greyish-ochreous clouded with blackish-grey towards the apex. The female, which is incapable of flight, has the fore-wings very acutely pointed towards the apex and the hind-wings trapezoidal and extremely small.

There is considerable variation in the distinctness of the markings and the amount of reddish suffusion.

The egg is very beautiful, about one-eightieth of an inch in length, pure white, cylindrical, slightly broader at one end, which is distinctly flattened; there are about 24 longitudinal ribs, with numerous fine raised transverse lines between each rib. The eggs are deposited indiscriminately and unattached.

The larva, which is of sluggish habit, lives in silken tubes in the earth amongst grass roots under stones. It is found on the sea-coast about ten feet above high-water mark. Its length, when full-grown is about $\frac{1}{2}$ inch, cylindrical tapering towards the head. The head is bright yellowish-brown; segments 2-6 are yellowish-white, segments 7-9 being tinged with black; the rest of the larva is whitish, irregularly tinged with chocolate-brown; the skin of the larva is velvety in appearance, the thoracic segments with

many transverse wrinkles; the segmental divisions on the darker parts of the larva are broadly ringed with white owing to the double thickness of skin there situated.

The pupa is enclosed in the silken tube inhabited by the larva.

The perfect insect emerges early in November.

Genus 6.—EUCHERSADAULA, Philp.

Head smooth, loosely haired behind; tongue developed. Antennae $\frac{3}{4}$ in σ with short even ciliations, basal segment moderate without pecten. Labial palpi rather long, recurved, second segment thickened with appressed scales, terminal segment half as long as second, slender, acute. Maxillary palpi minute, 4 jointed. Thorax smooth. Posterior tibiae rather long haired above. Fore-wings with slightly raised tufts of scales, vein 1b furcate, 2 and 3 short stalked from angle, 7 and 8 stalked, 7 to costa, 11 from middle. Hind-wings 1, cilia $\frac{3}{4}$, veins 3 and 4 connate, somewhat sinuate.

Represented by two very obscure species only.

EUCHERSADAULA LATHRIOPA.

(*Trachypepla lathriopa*, Meyr., Trans. Ent. Soc. Lond., 1905, 237.)

(Plate XXXI., fig. 13 σ .)

This very obscure-looking insect has occurred at Rau-rimu, Waimarino, Ohakune and Wellington in the North Island. In the South Island it has occurred at Nelson, on the Mount Arthur Tableland at an elevation of about 4,000 feet above the sea-level, and at Christchurch.

The expansion of the wings is considerably over $\frac{5}{8}$ inch. Superficially it is extremely similar to *Trachypepla anastrella*, from which it differs in its slightly larger size, longer wings, much shorter and more even ciliations of the antennae ($1\frac{1}{2}$ as against 3) and very indistinct markings. The fore-wings usually have two small blackish-brown spots in the disc at about $\frac{1}{3}$ and one beyond the middle; a curved series of obscure sub-terminal dots and occasionally a few similar dots on the termen.

The perfect insect appears in January. It frequents forest but seems to be rather local.

EUCHERSADAULA TRISTIS.

(*Euchersadaula tristis*, Philp., Trans. N.Z. Inst., lvi., 393.)

This species was discovered by Mr. Philpott at Nelson.

It differs from *Euchersadaula lathriopa* in the fore-wings, which are much darker and heavily sprinkled with dark, dull red scales in place of brown. The hind-wings are dark blackish-brown with bronzy reflections.

The perfect insect appears in December.

Genus 7.—COMPSISTIS, Meyr.

Antennae as long as fore-wings, basal joint without pecten. Hind-wings elongate-ovate.

An endemic genus represented by a single species.

COMPSISTIS BIFACIELLA.

(*Gelechia bifaciella*, Walk., Cat. xxix., 657; *Compsistis bifaciella*, Meyr., Trans. N.Z. Inst., xx., 90.)

(Plate XXX., fig. 14 σ .)

This brilliant little insect has occurred plentifully at Kaeo, Whangarei, Auckland, Raurimu, Waimarino, and

Wellington, and is probably common and generally distributed throughout the North Island.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are rather elongate, oblong, with the torus considerably rounded; shining coppery-brown thinly sprinkled with black scales; there is a small silvery patch near the base, a broad oblique band on the costa at about $\frac{1}{3}$ reaching half across the wing; an irregular patch near the middle and a curved sub-terminal band, broadest near the middle; all these silvery-white markings gleam with iridescent purple; the cilia near the apex are shining white tipped with black. The hind-wings are grey with coppery-brown reflections. The legs are black banded with shining white and the antennae have a broad white band immediately before the apex.

The perfect insect appears in November, December, and January. It is a diurnal flier and delights to bask on leaves in brilliant sunshine, and whilst thus engaged has a most refulgent appearance.

Genus 8.—THAMNOSARA, Meyr.

Basal joint of antennae without pecten. Second joint of labial palpi with projecting tuft of scales beneath. Hind-wings elongate-oval. (Plate G., figs. 10, 11, 12 neuration and head of *Thamnosara sublitella*.)

Another endemic genus represented by a single species.

THAMNOSARA SUBLITELLA.

(*Gelechia sublitella*, Walk., Cat. xxix., 654; *Thamnosara christa*, Meyr., Trans. N.Z. Inst., xvi., 27.)

(Plate XXX., fig. 28.)

This dull-coloured insect has occurred at Whangarei and Wellington in the North Island and at Mount Arthur (to 4,000 feet) and Christchurch in the South Island.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate-oval, pale brown, irregularly speckled and mottled with pale reddish-brown; there are slender black marks in the disc at $\frac{1}{3}$, near the middle, and beyond the middle; the costal edge is densely speckled with black towards the apex and the termen below the apex; the cilia are pale reddish-ochreous. The hind-wings are pale grey, the cilia pale greyish-ochreous mixed with darker grey.

Sometimes the blackish speckling extends over most of the fore-wings leaving paler costal and discal areas and some specimens are darker and greyer than others.

The perfect insect appears in November and December, and is found on dry forest-clad hills. It is a rare species.

The curious tuft of long, stout, hair-like scales on the second joint of the labial palpi, constitutes a remarkable feature in this insect, especially when contrasted with the extremely slender terminal joint. When at rest the wings are closely closed overlapping for more than half their length; the antennae are placed outside the wings along the midback; the palpi tufts project forwards, the apical joint being recurved upwards as usual.

Genus 9.—GYMNOBATHRA, Meyr.

Basal joint of antennae without pecten. Fore-wings with 2 rather remote from angle. Hind-wings elongate-ovate. (Plate G., figs. 16, 17, 18 neuration and head of *Gymnobathra hyetodes*.)

Most of the insects comprised in this genus appear during the latter end of summer, and closely imitate fallen leaves, a frequent habit of resting on the ground increasing the value of the protective resemblance. In several of the species the differences between the sexes are much greater than is usual amongst this group of Lepidoptera.

The larvae generally feed in the dead branches of trees during the winter and early spring, pupation usually taking place in early summer.

There are fifteen species known in New Zealand and, as yet, the genus has not occurred in any other country. Of these two are confined to the North Island, seven to the South Island, and six common to both islands.*

GYMNOBATHRA PHILADELPHA.

(*Gymnobathra philadelphia*, Meyr., Trans. N.Z. Inst., xvi., 33.)

Two specimens of this species were discovered by Fereday on Mount Hutt.

The expansion of the wings of the female is 1 inch. The fore-wings are sub-falcate, grey, somewhat mixed with ochreous-whitish: cilia with basal half grey, terminal half ochreous-whitish. Hind-wings grey-whitish, apex somewhat suffused with light grey; cilia whitish, round apex greyish-tinged.

Very similar in form to *Gymnobathra hyetodes*, but differing from both sexes in the grey fore-wings, the absence of markings, and the whitish hind-wings. It is probable that the male may have some points of difference from the female.

The perfect insect appears in January.

I am unacquainted with this species. The above particulars are taken from the original description.

GYMNOBATHRA HYETODES.

(*Gymnobathra hyetodes*, Meyr., Trans. N.Z. Inst., xvi., 32.)

(Plate XXX., fig. 11 ♂, 12 ♀.)

This interesting species has occurred at Swanson and in the neighbourhood of Wellington.

The expansion of the wings of the male is nearly $\frac{3}{4}$ inch, of the female 1 inch. The fore-wings of the male are dark greyish-ochreous with the apical third much paler; there is a conspicuous, strongly curved shaded transverse band of blackish-grey dividing the darker and lighter areas; two very minute discal dots at $\frac{1}{3}$ and a larger dot at $\frac{2}{3}$; the costa is slightly shaded with reddish-brown. The hind-wings are dark grey. The female is very bright ochreous with a curved brownish-ochreous transverse band at $\frac{2}{3}$ containing a darker brown discal dot; the costa is edged with brownish-ochreous. The hind-wings are bright ochreous very slightly tinged with reddish-brown near the apex. In both sexes the apex of the fore-wings is slightly falcate.

The perfect insect appears in February, and frequents dense forests, where it is sometimes fairly common. Its colouring is undoubtedly imitative of dead leaves, especially in the female. Both sexes very frequently rest on the ground, with closed wings, and this habit increases the value of the protective colouring. The sexual disparities exhibited by this species are strongly marked and very un-

*An article by Mr. Philpott on the Genitalia of the members of the genus *Gymnobathra* appears in the Transactions of the New Zealand Institute, vol. lvii., pp. 716-721.

usual in the group. Seeing that neither sex appears to be coloured for ornamental purposes, the peculiarities of the female, which is a very sluggish insect, must be attributed to the need for special protection, whilst she is depositing her eggs.

GYMNOBATHRA HABROPIS.

(*Gymnobathra habropis*, Meyr., Trans. N.Z. Inst., xx., 80.)

(Plate XXX., fig. 10 ♂.)

This delicate-looking species has occurred at Nelson and Dunedin.

The expansion of the wings is slightly under 1 inch. The fore-wings, which have the apex very pointed and the termen strongly concave and oblique, are pale yellowish-ochreous with faint grey markings; there are two discal dots before the middle and one beyond the middle; a dusky shading at the base of the costa and on the apex and termen. The hind-wings are white with the cilia tinged with grey near the apex. The antennae and fore-legs are brownish-black with white rings. There is sometimes a dusky shading round the outer discal dot.

The perfect insect appears from November till March and frequents forests. It seems to be rather a rare species, and at present has only been recorded from the South Island.

GYMNOBATHRA HAMATELLA.

(*Oecophora hamatella*, Walk., Col., xxix., 700; *Gymnobathra hamatella*, Meyr., Trans. N.Z. Inst., xvi., 31.)

(Plate XXX., fig. 16 ♂, 17 ♀.)

This rather distinctly-marked species has occurred at Wellington, Nelson, Takaka, Christchurch and Akaroa.

The expansion of the wings of the male is slightly over $\frac{3}{4}$ inch, of the female slightly over $\frac{1}{2}$ inch. The fore-wings of the male are very pale ochreous with dull brown markings; there is an oblique transverse band from $\frac{1}{3}$ of the costa to about $\frac{1}{4}$ of the dorsum; a small discal dot before the middle; a much broader, very irregular wedge-shaped, transverse band from $\frac{1}{3}$ of the costa to near the tornus; this band contains a darker elongate discal spot, followed by a patch of the pale ground-colour; there is a very indistinct terminal series of elongate marks; the costa is narrowly edged with brown and the cilia are dark brown. The hind-wings are pale grey with darker grey lunule and cilia. In the female the markings are rather bright yellowish-brown and the hind-wings very pale ochreous. The apex of the fore-wings is slightly falcate in both sexes. Occasionally the paler portions are more or less speckled with brown.

The perfect insect appears in February and March. It is usually found in gardens, or other cultivated places, and is sometimes attracted by light but, generally speaking, is not a common species.

GYMNOBATHRA CENCHRIAS.

(*Borkhausenia cenchrias*, Meyr., Trans. N.Z. Inst., xli., 13.)

(Plate XXIX., fig. 30 ♂.)

This distinct species was discovered by Mr. Philpott at Invercargill. It has also occurred at Dean's Bush, near Christchurch.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings, which are elongate with the apex and termen somewhat rounded, are pale brownish-ochreous with brown markings;

the costa is narrowly edged with brown from the base to $\frac{1}{2}$; there is a large irregular brown patch on the dorsum from the base to about $\frac{1}{3}$; this patch is slightly speckled with black and has a very large blackish-brown double spot at its termination; there is a very large black-edged brown discal spot beyond the middle; a brown patch on the costa almost touching it; a series of diminishing blackish-brown marks from the apex nearly reaching the tornus, and a blackish spot on the dorsum just before the tornus. The hind-wings are pale brownish-grey.

The perfect insect appears from December till February, and occurs fairly commonly in low lying kahikatea* forests, usually resting on the tree trunks. When disturbed it flies to the ground and hides amongst the dead leaves and twigs.

GYMNOBATHRA FLAVIDELLA.

(*Gelechia flavidella*, Walk., Cat., xxix., 655; *Oecophora utuella*, Feld., Reis. Nov., Pl. cxl., 46; *Gymnobathra flavidella*, Meyr., Trans. N.Z. Inst., xvi., 31.)

(Plate XXX., fig. 18 ♂, fig. 19 ♀ variety; Plate III., fig. 9 larva.)

This very beautiful little species is common and generally distributed throughout the North Island, but has not been taken south of Christchurch in the South Island.

The expansion of the wings varies from slightly over $\frac{1}{2}$ inch to nearly $\frac{3}{4}$ inch. The fore-wings are bright yellow, with rosy-brown markings; there is a minute mark on the costa at the base, a very indistinct costal edging and apical shading and three more or less distinct dark brown discal dots; a conspicuous triangular patch of rosy-brown is situated at the tornus, bordered towards the base with a blackish-brown line, which extends as a faint cloudy mark towards the costa. The hind-wings are white, with the costal and terminal portions strongly clouded with pale rosy-brown. The cilia of all the wings are rosy-brown. In some specimens the fore-wings are more or less clouded with orange-brown and, as already indicated, there is considerable variation in size.

The larva inhabits dead or dying terminal shoots of wharangi (*Brachyglottis repanda*), feeding on the central pith. It lives during the winter and spring months, being full-grown about November. At this time its length is about $\frac{5}{8}$ inch; the head is globose, bright shining reddish-brown; the body is elongate slender and cylindrical; the second segment is furnished with a pale ochreous dorsal plate; the third and fourth segments are slightly swollen, the remaining segments being elongate, with the divisions clearly marked. The general colour of the larva is pale ochreous, with a pale reddish-brown dorsal line, indicating the position of the alimentary canal. The whole surface of the larva is highly polished, but no warts or tubercles are visible, although such probably exist as hardened spots.

The pupa state is spent within one of the burrows made by the larva.

The perfect insect appears from the end of December until late in February. It is found in forests, where it is often very common.

The very beautiful colouring of this species suggests that its charms may have been acquired for the purpose

of sexual attraction, and when flying, or running about, its brilliance renders it somewhat conspicuous. When, however, it is resting on the ground with closed wings, the rosy-brown hind-wings being then hidden, it closely resembles a small bright yellow fallen leaf, and as the insect so often falls motionless to the ground when disturbed, and is common during the late summer, this resemblance is not likely to be accidental. It may therefore be fairly assumed that the peculiarities displayed by this interesting and attractive little insect are chiefly due to the combined operations of natural and sexual selection.

GYMNOBATHRA COARCTATELLA.

(*Cryptolechia coarctatella*, Walk., Cat. xxix., 768; *Gymnobathra coarctatella*, Meyr., Trans. N.Z. Inst., xvi., 28.)

(Plate XXX., fig. 15 ♀.)

This rather bright-looking species has occurred at Wellington, Nelson, Takaka, Castle Hill, Ida Valley, Invercargill, and Stewart Island. It is probably generally distributed throughout the country.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are bright orange-brown; there is usually a more or less conspicuous black discal spot beyond the middle and sometimes two smaller spots near the fold before the middle. The hind-wings are bright ochreous, clouded with grey towards the base.

In some specimens the colouring of the fore-wings is much brighter than in others and, as already indicated, there is variation in the presence or absence of the black discal spots.

The perfect insect appears from November till February. It frequents forests or scrub, being most plentiful either in beech forests (*Nothofagus*) or in manuka scrub (*Leptospermum*). When disturbed it usually falls to the ground with closed wings, and in this situation the shape and colouring of the fore-wings cause it to closely resemble a small dead leaf. In this connection it is interesting to observe that the red form of *Cryptolechia liochroa* which, superficially, closely resembles a large specimen of the present species, has a precisely similar habit.

GYMNOBATHRA SARCOXANTHA.

(*Gymnobathra sarcoxantha*, Meyr., Trans. N.Z. Inst., xvi., 29.)

This species, which is very closely allied to the last, has occurred at Christchurch, Dunedin and Lake Wakatipu.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. It differs from *Gymnobathra coarctatella* in the following respects:—The fore-wings are more elongate and the ground colour much lighter, being often dull ochreous. The hind-wings are whitish-ochreous, and are not clouded with grey.

The perfect insect appears from January till March. It is probably often mistaken for a worn or faded specimen of *G. coarctatella*.

**Podocarpus dacrydioides*.

GYMNOBATHRA PARCA.

(*Oecophora parca*, Butl., Proc. Zool. Soc. Lond., 1877, 405; *Gymnobathra parca*, Meyr., Trans. N.Z. Inst., xvi., 29; *Oecophora umbata*, Butl., Cist. Ent. ii., 560 [1880])

(Plate XXX., figs. 1, 2 ♂ varieties.)

This rather dull-looking variable species has occurred at Christchurch, Castle Hill, Lake Wakatipu and Invercargill. It is probably generally distributed throughout the South Island.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings vary from very dark yellowish-brown to dull ochreous; there are usually obscure cloudy discal spots at $\frac{1}{2}$ and $\frac{3}{4}$, and sometimes an oblique mark on the fold. The hind-wings are dark grey, slightly paler towards the base.

The perfect insect appears from December till March. It frequents open grassy hills and seems to be commonest in somewhat elevated situations. It is extremely abundant at Castle Hill, at an altitude of about 2,500 feet, and is also found on the ranges around Lake Wakatipu to elevations of about 4,000 feet.

GYMNOBATHRA CALLIPOLOA.

(*Gymnobathra calliploa*, Meyr., Trans. N.Z. Inst., xvi., 30.)

(Plate XXX., fig. 9 ♂.)

This very distinctly-marked species has occurred at Wellington, Otira River, Dunedin, Lake Wakatipu and Invercargill.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings, which have the apex slightly rounded, are pale brownish-ochreous with a very few scattered grey scales; there are five very distinct black dots on the outer half of the costa, three discal dots forming a rather elongate triangle near the middle of the wing, and a terminal series of obscure dusky marks; the terminal area is usually more densely speckled with grey than the rest of the wing. The hind-wings are very pale grey with a darker grey discal dot and apical shading.

Some specimens are slightly darker than others, but beyond this there is no important variation.

The perfect insect appears from December till February, and frequents dense forests. It is rather a rare species near Wellington, and, as a rule, only one or two specimens are observed in the course of a season, but according to Mr. Philpott, it is quite common in the neighbourhood of Invercargill.

GYMNOBATHRA BRYAULA.

(*Gymnobathra bryaula*, Meyr., Trans. Ent. Soc., Lond., 1905, 238.)

(Plate XXX., fig. 22 ♂, 23 ♀; Plate III., fig. 7 larva.)

This pretty species has occurred at Wellington.

The expansion of the wings of the male is slightly under $\frac{3}{4}$ inch, of the female slightly over $\frac{3}{4}$ inch. The fore-wings of the male are yellowish-green speckled with black, and with black markings; there are two small black spots at the base; a small double spot near the base in the middle; three oblique discal spots before the middle; a dumbbell-shaped mark in the disc beyond the middle; two small spots above the tornus; a deeply-indented broken transverse line from the costa before the apex to the tornus; a series of double dots on the costa and a series of single spots on the termen. The

hind-wings are greyish-ochreous, with a series of black dots on the cilia. In the female the fore-wings are rather dull orange-brown, with similar black markings to the male, but both fore- and hind-wings are somewhat narrower.

The larva inhabits dead branches of the common fuchsia (*Fuchsia excorticata*), drilling numerous burrows through the solid wood on which it feeds. It lives through the winter and is full-grown about October. At this time its length is about $\frac{3}{4}$ inch; it is slender, elongate, cylindrical and of almost uniform thickness; its general colour is reddish-brown, very strongly tinged with purple, and of a velvety appearance. The head is dark reddish-brown and shining; the second segment paler; the third with two horny plates; each of the remaining segments has, towards its posterior edge, four large blackish warts, each wart emitting a bristle; the last segment is yellowish-brown and horny. This larva is very active, darting backwards and forwards with great agility when disturbed. The pupa state is spent in one of the burrows made by the larva.

The perfect insect appears during the first week in January and is usually over before the end of the month. It is invariably found resting on tree trunks and seems very unwilling to fly. The colouring of the male is highly protective amongst moss, that of the female apparently imitates the bark of the fuchsia, and this no doubt effectively protects her from enemies whilst she is engaged in depositing her eggs. The disparity between the sexes is remarkable, and judging by the much greater apparent rarity of the female, her means of concealment must be superior to that of the male.

GYMNOBATHRA THETODES.

(*Gymnobathra thetodes*, Meyr., Trans. Ent. Soc. Lond. 1901, 574.)

(Plate XXX., fig. 24 ♂.)

This very dull-looking species has occurred on the Lyttelton Hills and at Akaroa.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-oblong with the termen slightly rounded; pale brown with obscure darker brown markings; there is a small spot on the costa at the base and another on the dorsum; two discal spots at $\frac{1}{2}$ and one at $\frac{3}{4}$; an ill-defined cloudy streak in the disc from $\frac{1}{2}$ to the termen; an obscure series of elongate sub-terminal and terminal spots; the entire wing is also irregularly dotted with dark brown scales. The hind-wings are pale ochreous, thickly strewn with pale brown scales.

The perfect insect appears from November till January.

Described and figured from a specimen in the Fere-day collection.

GYMNOBATHRA THOLODELLA.

(*Gymnobathra tholodella*, Meyr., Trans. N.Z. Inst., xvi., 30.)

(Plate XXX., fig. 3 ♂.)

This very dull-looking little species appears to be common and generally distributed throughout the country.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are pale ochreous-brown thickly speckled with blackish-grey; there is a cloudy blackish-grey discal spot at $\frac{1}{2}$ and a

larger spot at $\frac{3}{4}$, a third oblique spot being sometimes situated on the fold. The hind-wings are dark greyish-ochreous. The cilia of all the wings are pale ochreous with a dusky line.

There is much variation in the density of the blackish-grey speckling on the fore-wings, as well as in the depth of the colouring of the hind-wings. In the paler forms the darker colouring is chiefly confined to the outer portions of the fore-wings, the basal and central areas being usually paler. In the darker varieties the pale ochreous cilia are very conspicuous.

The perfect insect appears from the end of January until the end of March, and frequents forests, where it is often very abundant. It is specially characteristic of the late summer and autumn, and its dull tints afford it excellent concealment amongst the dried and faded vegetation prevalent at that season. When resting the wings are tightly closed and wrapped around the body; the head is raised, the anterior and middle legs slightly extended, and the hind-wings invisible; the antennae are placed backwards along the midback, and in contact towards their tips.

GYMNOBATHRA OMPHALOTA.

(*Gymnobathra omphalota*, Meyr., Trans. N.Z. Inst., xx., 81.)

(Plate XXX., fig. 25 ♂, 26 ♀.)

This very active sun-loving species has occurred at Ohakune, Palmerston North, Wellington, Nelson, Buller and Otira Rivers, Christchurch, Lake Wakatipu, and Invercargill, and is probably common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings of the male are dull black, with the basal three-quarters irregularly sprinkled with white and dull yellow scales; there are two rather large discal spots at $\frac{1}{4}$, obscurely margined with dull yellow; a white mark on the costa at $\frac{1}{4}$; a large irregular black-edged reniform spot at $\frac{3}{4}$; a conspicuous wavy white transverse line from $\frac{1}{4}$ of the costa to the tornus; there is an almost clear black terminal area, with two terminal rows of white and dull yellow dots, and a small bronzy yellow patch on the cilia at the tornus. The hind-wings are blackish-grey, with a darker discal dot. The female has the entire ground colour very much paler, but otherwise resembles the male.

The larva, which feeds in the bark of living *Nothopanax* trees, during the winter and early spring, is about $\frac{1}{2}$ inch in length, slender, cylindrical, with the skin much wrinkled. The head and second segment are dull yellowish-brown and horny, the second segment being narrowly edged with dull white in front. The rest of the body is dull grey; all the segments are clothed with numerous rather long bristles; there are two rows of dark grey warts down the back.

The perfect insect appears from the beginning of November until the end of December. It flies with great agility in sunny glades in the forest and is consequently difficult to capture. In fact its black colouring and rapid movements baffle the eye of the pursuer, and no doubt preserve it from destruction by many enemies. This insect appears in the early summer, and it is therefore very interesting to find that the protective "autumnal" tints charac-

teristic of most of the other members of the genus, are here replaced by more seasonable, but equally effective, methods of protection.

GYMNOBATHRA SQUAMEA.

(*Gymnobathra squamea*, Philp., Trans. N.Z. Inst., xvii., 200.)

(Plate XXX., fig. 13 ♂.)

This very distinct little species was discovered by Mr. Philpott on Mount Cleughearn, near Lake Monowai, at an altitude of about 3,500 feet above the sea-level. Mr. C. E. Clarke has taken it on the Kepler Mountains, near Lake Te Anau.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are oblong with the termen nearly straight; dark blackish-brown very thickly strewn with deep yellow hair-like scales. The hind-wings are dark blackish-grey, paler near the base. The cilia of all the wings are pale grey.

The perfect insect appears in January, and is found on open country at high elevations.

Described and figured from the type specimen in Mr. Philpott's collection.

Genus 10.—AOCHLETA, Meyr.

Basal joint of antennae without pecten. Second joint of labial palpi with rough projecting scales towards apex beneath. Fore-wings with 2 remote from angle. Hind-wings trapezoidal-ovate.

This endemic genus is represented by one species only.

AOCHLETA PSYCHRA.

(*Aochleta psychra*, Meyr., Trans. N.Z. Inst., xvi., 21.)

This species was discovered at Castle Hill by J. D. Enys.

The expansion of the wings of the male is about $\frac{3}{4}$ inch. The fore-wings are elongate, slightly dilated, whitish, irregularly irrated with grey and fuscous scales; these tend to form suffused markings, a spot on middle of dorsum, another above tornus, a narrow suffusion along posterior half of costa, and an apical patch; a small cloudy darker spot towards termen in middle; a minute black dot in disc at $\frac{1}{4}$, another slightly above it in middle, and a very small blackish ocellus in disc at $\frac{3}{4}$; cilia whitish with two cloudy grey lines. Hind-wings whitish.

Not closely resembling any other species.

I am unacquainted with this insect. The above particulars have been taken from the original description.

Genus 11.—IZATHA, Walk.

Basal joint of antennae without pecten. Terminal joint of labial palpi with median scale-projection posteriorly. Fore-wings with tufts of scales; 2 remote from angle. Hind-wings trapezoidal-ovate, 5 bent and approximated to 4 at base. (Plate G., figs. 25, 26, 27 neuration and head of *Izatha peroncanella*.)

This very interesting endemic genus is principally distinguished by the possession of a characteristic tuft of scales on the middle of the terminal joint of the palpi; the peculiar tufts of raised scales on the fore-wings and the approximation of veins 4 and 5 of the hind-wings, vein 5 being very distinctly bent. Most of the species imitate

lichens, and in many the colouring is very beautiful. One of them, *Izatha peroneanella*, may be ranked as one of the loveliest of the New Zealand Lepidoptera. All the species are characteristic of midsummer, few appearing earlier than December, or remaining later than the middle of February. The perfect insects almost invariably rest with closed wings on tree trunks, and in this situation the protective colouring of the fore-wings is brought most effectively into use. The larvae are wood-borers, and feed in the dead branches of various trees during the winter, pupation taking place the following spring. Much pleasure awaits the field naturalist who investigates these insects, as the beauty of their perfect adaptations can only be properly appreciated by a study of living specimens, in their natural surroundings.

There are nineteen species in New Zealand, and probably others remain to be discovered. Nine species are confined to the North Island, four to the South Island, and six occur in both islands.

IZATHA PERONEANELLA.

(*Gelochia peroneanella*, Walk., Cat. xxix., 658; *Semiocosma peroneanella*, Meyr., Trans. N.Z. Inst., xvi., 22; *Cryptolechia lichencella*, Walk., Cat. xxix., 769; (?) *adapertella*, ibid. 653; *Semiocosma mystis*, Meyr., Trans. N.Z. Inst., xx., 79.)

(Plate XXV., fig. 54 ♂; Plate III., fig. 6 larva.)

This lovely insect is fairly common and generally distributed throughout the country.

The expansion of the wings varies from about $\frac{1}{4}$ inch to slightly over 1 inch. The fore-wings are pale green, with a number of sharply-defined angulated black markings on the basal and discal portions of the wing, and a marginal series of black dots extending from $\frac{1}{4}$ of the costa to slightly beyond the tornus. The hind-wings are pale brownish-grey, darker towards the apex; there is usually a darker discal dot and a series of indistinct dusky marks on the termen.

Much variation occurs in the pale green ground colour of the fore-wings, which ranges from yellowish-green to almost blue; the angulated black markings also vary a little in shape and, on the disc, are associated with more or less prominent tufts of raised scales. The hind-wings also vary in the depth of colouring.

The larva is very elongate, cylindrical and of uniform thickness. The head is bright reddish-brown and very shining; the second segment is furnished with a large pale brown horny plate; the third segment with a narrow horny ridge; the other segments, except the last three, are dull white, with the blackish-brown alimentary canal showing through the skin, especially behind each segmental division; the last three segments are yellowish-ochreous, the last segment having an indistinct brown horny plate. The third and fourth segments are each furnished with a transverse row of bristles and the last segment with numerous bristles. There is a conspicuous white lateral ridge.

This caterpillar varies considerably in colour, some individuals being much darker than others. It is a wood-borer, living in the dead branches of *Aristotelia racemosa* and probably other trees. It is very active, excavating numerous galleries in the wood, but does not live immediately under the bark. This larva evidently feeds through-

out the winter, and is full-grown about the beginning of November.

The pupa, which is enclosed in one of the burrows without any cocoon, is rather elongate, bright ochreous-brown, paler on the leg and wing-cases. There is a remarkable series of parallel horny ridges, on the back of the segment immediately below the wing-cases, which no doubt helps the pupa to work its way to the open air before emergence. The cremaster is rather long and the whole pupa is covered with short hairs.

The perfect insect appears from November till February, and frequents scrubby forest. It is nearly always found resting on tree-trunks with closed wings, where its exquisite green and black colouring causes it to closely resemble the green lichens so often found in such situations. The raised scales and black markings imitate those minute curled portions of the lichens which show the black under surface. This species is found later in the season than most others of the genus. It is often taken, in good condition, during the last week in February.

IZATHA HUTTONII.

(*Oecophora huttonii*, Butl., Cist. Ent., ii., 511.)

(Plate XXV., fig. 43 ♂.)

This pretty species has occurred at Kaeo, North of Auckland, Raurimu, Ohakune, and many localities in the neighbourhood of Wellington.

The expansion of the wings varies from about $\frac{1}{4}$ inch to $1\frac{1}{2}$ inches. It closely resembles *I. peroneanella* but the green ground colour of the fore-wings is replaced by creamy white and the black markings are pale brown, or dark brown, and finer and less numerous than in that species. The hind-wings are white, sometimes very slightly tinged with brown.

The life-history no doubt closely resembles that of *I. peroneanella*.

The perfect insect appears in December and January. It rests with closed wings on the trunks of trees, the fore-legs being extended in front of the insect and the antennae held back under the wings. In this situation it bears a fairly close resemblance to a patch of white lichen, but the protection is not nearly so perfect as in *I. peroneanella*.

IZATHA HEROICA.

(*Izatha heroica*, Philp., Trans. N.Z. Inst., lvi., 396; *Izatha torcumia*, Clarke, ib. 419.)

(Plate XXII., fig. 32 ♂, 33 ♀.)

This rather large, pale-looking species, was discovered by Mr. Philpott, at the Flora River, Mount Arthur. It has also occurred at Arthur's Pass.

The expansion of the wings of the male is almost $1\frac{1}{2}$ inches; of the female slightly over $1\frac{1}{2}$ inches. The fore-wings of the male are white, very sparsely strewn with a few pale grey scales, especially on the terminal third; the markings are small, black; two oblique bars on basal third of costa; three fine lines on basal half of fold; a fair-sized spot in disc beyond middle, preceded by two minute sub-costal spots; a small sub-costal spot at about $\frac{1}{3}$; two cloudy sub-terminal spots; a series of small spots around

apical third of costa and along termen. The hind-wings are greyish-white with faint lunule and terminal marks. In the female the fore-wings are heavily strewn with greyish scales; the small black markings are much less distinct, and the hind-wings are pale ochreous.

Easily distinguished from *I. huttonii* by its grey tinge and very fine black markings.

The perfect insect appears in January and may be looked for in sub-alpine forests at about 3,500 feet above sea-level.

I am indebted to Mr. Philpott for the opportunity of describing the female insect.

IZATHA PICARELLA.

(*Oecophora picarella*, Walk., Cat. xxix., 699; *Psecadia teras*, Feld., Reis. Nov., Pl. cxl. 28; *Semioscosma picarella*, Meyr., Trans. N.Z. Inst., xvi., 23.)

(Plate XXV., fig. 39 ♀.)

This very striking species has occurred at Waitakere, Ohakune, Wellington, Christchurch, Dunedin and Invercargill.

The expansion of the wings is slightly under 1 inch. The fore-wings are clear white with very sharply-defined heavy black markings; there is an irregular oblique patch at the base; an irregular oblique marking on the costa at about $\frac{1}{3}$, nearly reaching to the dorsum; another irregularly branched marking from about $\frac{2}{3}$ of the costa, nearly reaching the tornus; three small spots are situated on the costa before the apex and a large irregular mark at the apex; there is a series of confluent terminal dots; the cilia are white, becoming black on the lower $\frac{2}{3}$ of the termen. The hind-wings are dark brownish-grey, darker towards the apex and termen; there is a dusky discal dot.

The perfect insect appears in December and January, but as a rule is rarely met with. Mr. Meyrick states, however, that he found it rather commonly on fences and at light near Dunedin. In the Wellington district it is usually taken resting on trees, or fences, its colouring no doubt imitating black and white lichens. In this respect it closely resembles *Declana atronivea*, and such a close superficial resemblance between two insects so far apart in actual relationship is very interesting. The wing markings in both species have no doubt been independently acquired for similar protective purposes.

IZATHA ACOMNIAS.

(*Izatha acomnias*, Philp., Trans. N.Z. Inst., liii., 340.)

(Plate XXV., fig. 29 ♂.)

This species, which is regarded by Mr. Meyrick as identical with *I. picarella*, has occurred on Mount Ruapehu, at Masterton, Mount Arthur, the Otira River, Lake Wakatipu, and around Invercargill.

The expansion of the wings ranges from slightly over 1 inch to about 1½ inches. It differs from *I. picarella* in its generally larger size, slightly more pointed apex to the fore-wings, and absence of black cilia on the lower portion of the termen. The hind-wings are also paler grey, with a much stronger discal dot, and a series of obscure dusky marks between the veins near the apex.

The perfect insect appears in December. At Otira several very fine specimens were dislodged from dead lace-bark trees (*Gaya Lyallii*) which were heavily covered with lichens. From this it appears probable that the larva is a wood-borer in the lace-bark. Mr. Philpott, who has known this insect for many years at Invercargill, considers that it is quite distinct from *Izatha picarella*.

IZATHA BALANOPHORA.

(*Semioscosma balanophora*, Meyr., Trans. Ent. Soc. Lond., 1897, 389.)

(Plate XXXII., fig. 3 ♂.)

This rather inconspicuous species has occurred in the North Island at Waitomo and Wellington. In the South Island it has been found on Bold Peak, Lake Wakatipu, and Flagstaff Hill, Dunedin.

The expansion of the wings of the male is about $\frac{1}{2}$ inch, of the female about 1 inch. The fore-wings are dull white, very finely speckled with pale brown. There are three narrow brown marks on the costa; one at the base, one before the middle, and the last and smallest beyond the middle; a large curved blackish-brown mark is situated in the disc and a series of faint brown streaks on each of the veins beyond the middle; there is an obscure sub-terminal shade and a series of faint marginal dots from $\frac{1}{2}$ of the costa to the tornus. The hind-wings are very pale ochreous-brown. In the female the large curved discal streak is replaced by two slender blackish-brown marks.

The perfect insect appears in November and December, but is not often met with. It seems to frequent rather open situations and most of the specimens taken have been found resting on fences or tree-trunks.

IZATHA MANUBRIATA.

(*Izatha manubriata*, Meyr., Trans. N.Z. Inst., liv., 165.)

(Plate XXX., fig. 8 ♂.)

This species seems to be confined to the Wakatipu district, where it has occurred on Ben Lomond and on Mount Aurum at elevations of about 3,000 feet.

The expansion of the wings is slightly under 1 inch. The fore-wings, which have the apex rather pointed and the termen oblique, are pale grey irregularly sprinkled with darker grey scales; there is a black-edged dark grey basal patch considerably produced on the fold; an elongate, somewhat crescent-shaped, longitudinal black line in the disc with a black dot above it and a grey suffusion below; a small black dot on the fold; cloudy black bars on the costa at $\frac{1}{2}$ and $\frac{2}{3}$ and a series of blackish dots along apical third of costa and on termen. The hind-wings are grey.

The perfect insect appears in January, and may be looked for near the edges of beech forest on the mountains. It is a rare species.

IZATHA APODOXA.

(*Semioscosma apodoxa*, Meyr., Trans. N.Z. Inst., xx., 79.)

(Plate XXXII., fig. 2 ♀.)

This very obscurely-marked species has occurred at Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dull white finely speckled with pale greyish-brown; there is

a slender angulated line from $\frac{1}{4}$ of costa to the disc before middle, continued as a broken line almost to the dorsum; an ill-defined brownish patch on the dorsum near the middle and a similar round patch above the tornus; an angulated dark brown mark in the disc beyond the middle; a short oblique streak from the apex and a series of marginal spots from $\frac{1}{4}$ of the costa along the termen to the tornus. The hind-wings are ochreous-grey with a very obscure discal dot.

The perfect insect appears in November and December. It is occasionally found resting on fences in the town of Wellington, and at present does not seem to have been observed in any other locality.

IZATHA CAUSTOPA.

(*Semiocosma caustopa*, Meyr., Trans. N.Z. Inst., xxiv., 219.)

(Plate XXV., fig. 25 ♀.)

This large and rather conspicuous species has occurred in the neighbourhood of Wellington.

The expansion of the wings varies from slightly under 1 inch to $1\frac{1}{4}$ inches. The fore-wings are pale brownish-ochreous with the central portions strongly clouded with rich chocolate brown; there is a black longitudinal streak from the disc near the middle almost reaching the termen below the apex; this streak traverses a conspicuous black spot near its origin, and is doubled for a short distance before its termination; a broad pale brown marginal band extends from considerably before the apex to the tornus, the spaces between the veins being clouded with darker brown; there is a rather indistinct series of marginal dots. The hind-wings are pale ochreous slightly clouded with brown towards the apex and termen.

The larva, which closely resembles that of *Izatha attackella*, feeds during the winter months in the dead branches of the common fuchsia (*Fuchsia excorticata*), driving burrows through the soft wood in all directions. It is full-grown about October.

The perfect insect appears towards the end of December and is seldom observed later than the middle of January. It is extremely local, apparently being confined to certain patches of fuchsia trees, where one or two specimens may, perhaps, be taken for several successive seasons. When resting with closed wings this insect closely resembles the dark patches on the pale brown bark of the fuchsia and on several occasions I have found recently emerged specimens at rest on the stems of the fuchsia.

IZATHA ATTACKELLA.

(*Izatha attackella*, Walk., Cat., xxix., 787; *Semiocosma platyptera*, Meyr., Trans. N.Z. Inst., xx., 80.)

(Plate XXV., fig. 30 ♂, 31 ♀.)

This species, which is one of the largest of the genus, has occurred at Ohakune, Palmerston North and at Wellington.

The expansion of the wings of the male is nearly $1\frac{1}{4}$ inches, of the female $1\frac{3}{4}$ inches. The fore-wings of the male are white, rather densely sprinkled with brown dots, the markings are also brown; there are two indistinct, broken, transverse lines near the base; a longitudinal black streak from the base to the disc at $\frac{1}{4}$; the terminal area is rather indefinitely mottled with brown; there is a cloudy triangular patch on the costa just before the apex containing several small dark marks and a rather distinct

series of terminal dots. The hind-wings are pale ochreous. In the female the fore-wings are very densely speckled with dull reddish-brown and, with the exception of the basal longitudinal streak, the markings are very indistinct. The hind-wings of the female are pale ochreous-brown.

The larva lives under the bark of dead hinau trees (*Elaeocarpus dentatus*) and also under the bark of dead wineberry (*Aristotelia racemosa*); beech (*Nothofagus*) as well as in the dead stems of the ngaio (*Myoporum laetum*), the nikau palm (*Rhopalostylis sapida*), and probably many other trees. It feeds during the whole of the winter, eating the soft inner surface of the bark, but often leaving the solid wood untouched. When full-grown its length is about $\frac{3}{8}$ inch. The body is elongate, slightly flattened, with the anterior portions rather stouter; the head is dark brown and shining; the second segment horny with a dorsal furrow; the third segment with two rounded triangular dorsal plates, not meeting on the back; the remaining segments except the last are soft, ochreous-white with three horny warts on each side, each wart emitting rather long bristles; the last segment has a horny dorsal plate; the head and other horny portions of the larva are also furnished with numerous bristles.

The pupa is pale ochreous, tinged with brown on the head and towards the posterior extremity; there are six rows of dorsal spines and the cremaster is blunt, furnished with several short thick processes. It is enclosed in an oval cocoon, constructed of silk and fragments of wood, situated under the bark. The larva is generally full-grown about September, and the pupa state lasts for a month or six weeks.

The perfect insect appears from September until December, but is rarely seen. Larvae and pupae may, however, be found plentifully in the dead trees mentioned, and are easily reared in captivity.

IZATHA COPIOSELLA.

(*Gelechia copiosella*, Walk., Cat., xxx., 1028.)

(Plate XXV., fig. 26 ♂; 27 ♀.)

This dull-looking species, which is the largest of the genus at present known, has occurred at Waimarino, Rau-rimu and Ohakune.

The expansion of the wings of the male is $1\frac{1}{4}$ inches, of the female $1\frac{1}{2}$ inches. The fore-wings are oblong, rather broad, especially in the male, with the termen slightly oblique; dull reddish-brown with indistinct dark purplish-brown or blackish markings; there is an interrupted streak along the fold; two broad bars on the costa near the base; a broad cloudy transverse band at about $\frac{3}{4}$ partly encircling a faint discal spot; a fine broken sub-terminal line and a series of costal and terminal dots. The hind-wings are dark grey. The female is considerably larger and paler in colour with the markings less distinct and the hind-wings greyish-ochreous in place of dark grey. In general appearance both sexes somewhat resemble the female of *Izatha attackella*.

The perfect insect appears in January, and is found in forests. Its colouring is highly protective when resting on tree-trunks.

IZATHA METADELTA.

(*Izatha metadelta*, Meyr., Trans. Ent. Soc. Lond. 1905, 238;

Izatha percnitis, Meyr., Trans. N.Z. Inst., xli., 14.)

(Plate XXX., fig. 20 ♂, 21 ♀.)

This rather dark-looking species has occurred at Ohakune, and in the neighbourhood of Wellington.

The expansion of the wings of the male is slightly over $\frac{3}{8}$ inch, of the female $\frac{3}{8}$ inch. The fore-wings of the male are rich brown; there is a black-edged, deep brown, oblique, transverse band from the costa at about $\frac{1}{3}$, not quite reaching the dorsum; another very broad band at about $\frac{2}{3}$, containing a large, black-edged, darker spot on the disc; the termen is shaded with dark brown. The hind-wings are very dark blackish-brown, darkest near the apex and termen. The female is much paler, the ground colour being pinkish-brown, and the dark markings much more distinct in consequence; there is in addition a strongly curved pale sub-terminal line, and a series of terminal dots. The hind-wings in the female are dark brownish-ochreous, darker towards the apex and termen. In both sexes the head is furnished with a well-marked conical horny frontal prominence.

The larva, which feeds under the bark of dead wine-berry trees (*Aristotelia racemosa*), closely resembles that of *Izatha austera* except that it has no tubercles. The habits of the two larvae are also identical.

The perfect insect appears from November till February. It frequents forest, but is rarely met with. It seems to be rather a late species and is more often seen in February than at any other time. In general appearance it somewhat resembles *Izatha epiphanes*, but is clearly distinct from that species.

IZATHA EPIPHANES.

(*Semioscosma epiphanes*, Meyr., Trans. N.Z. Inst., xvi., 24.)

(Plate XXV., fig. 24 ♀.)

This distinctly-marked species has occurred at Waitomo and in the neighbourhood of Wellington in the North Island. In the South Island it has been found at Lake Harris.

The expansion of the wings is from $\frac{3}{4}$ inch to 1 inch. The fore-wings are dull creamy white with blackish-brown markings; there is an irregular basal patch becoming fainter and broader towards the dorsum; a very large irregular pale-centred patch on the costa not reaching the dorsum but emitting a fine curved line almost touching the basal patch and two short teeth towards the termen; two small blackish spots are situated on the costa before the apex and a cloudy series of spots on the termen; the central portions of the cream-coloured areas are more or less clouded with pale brown and there is sometimes a faint, bluish-grey sub-terminal shading. The hind-wings are brownish-grey.

There is considerable variation in the intensity of the dark markings and in the colour of the central portions of the pale areas. Some specimens are so much clouded with pale brown, or greyish-brown, that very little of the original cream colour remains.

The larva tunnels the dead branches of *Pittosporum*, *Fuchsia*, and probably other trees, feeding during the winter months and becoming full-grown in the early spring.

The perfect insect appears from the middle of November until the end of December. It is almost always found

resting on fences, or tree-trunks, its colouring evidently imitating lichens. It is never met with in large numbers and, as a rule, only one or two specimens are observed in a season.

IZATHA MIRA.

(*Izatha mira*, Philp., Trans. N.Z. Inst., xlv., 78.)

(Plate XXXI., fig. 6 ♀.)

This very distinctly-marked species has occurred at Riccarton near Christchurch, at Dunedin, on Mount Earnslaw at an elevation of 4,000 feet above the sea-level and on the Hump Ridge, Southland, at about 3,000 feet, also on Longwood Range.

The expansion of the wings is about $\frac{3}{8}$ inch. The fore-wings are elongate-oblong with the apex strongly rounded; dark bluish-grey with black markings; there is a short, oblique wavy transverse band near the base; another very oblique, strongly angulated band from the costa at $\frac{1}{3}$ nearly reaching the dorsum at the middle; a triangular discal spot beyond the middle and a short sub-terminal band not reaching the costa; all these black markings are edged with bluish-white. The hind-wings are deep bronzy-brown, with a cloudy bronzy-black terminal band.

The perfect insect appears from December till February. It frequents the upper edges of the beech forest on the mountain sides, flying rapidly in the hottest sunshine. It is apparently a very rare species.

IZATHA PRASOPHYTA.

(*Semioscosma prasophyta*, Meyr., Trans. N.Z. Inst., xvi., 25.)

(Plate XXXII., fig. 4 ♀.)

This very distinct, dull, golden-green species has occurred at Kaco, North of Auckland, at Wellington, and at Taranaki.

The expansion of the wings of the male is slightly under $\frac{3}{4}$ inch, of the female slightly over $\frac{3}{4}$ inch. The fore-wings are narrowly-oblong with the termen rather oblique, dull ochreous-green with brassy reflections; there is an oval, black-edged, white spot on the costa at the base; a white basal patch traversed by a very irregular blackish transverse line; two small blackish-brown marks on the costa before and beyond the middle; one or two patches of dark brown scales in the disc; two or three rather indistinct, curved, white transverse lines on the terminal area; four dark brown spots on the costa before the apex and a broken dark brown terminal line. The hind-wings are pale ochreous, clouded with brownish-grey towards the apex and termen.

The perfect insect appears from the beginning of December until the end of February. It frequents forest, but is not often met with. Its peculiar colouring evidently imitates certain lichens, having a similar hue. When at rest the wings are held flat, slightly overlapping; the antennae are placed backwards along the costa, the heavily-tufted tibiae of the intermediate legs are exposed and are coloured the same as the pale basal patch. They thus "break up" the outline of the insect and much increase the value of the protective colouring. This species is occasionally captured at light.

IZATHA AUSTERA.

(Semiocosma austera, Meyr., Trans. N.Z. Inst., xvi., 25.)

(Plate XXXII., fig. 6 ♀; Plate III., fig. 31 larva.)

This very dark, dull-looking species has occurred at Whangarei, Kaeo, Auckland and various localities in the neighbourhood of Wellington.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are dark brown more or less mixed with paler brown; there is a conspicuous black spot on the fold at $\frac{1}{2}$; an arched dark brown mark in the disc beyond the middle; a curved series of paler brown spots on the terminal area, often forming a continuous band and a marginal series of pale spots from before the apex to the tornus. The hind-wings are very dark blackish-brown, paler towards the base.

There is considerable variation in the extent of the light and dark colouring on the fore-wings.

The larva lives in silken tubes under the bark of dead wineberry trees (*Aristotelia racemosa*) during the winter months, becoming full-grown about September. Its length is slightly over $\frac{1}{2}$ inch; slender and cylindrical; the head is reddish-brown, highly polished; the second segment dark brown and horny; the third segment has two triangular brown horny dorsal plates; the rest of the body is dull ochreous, with a very broad slaty-black dorsal band and four conspicuous horny dorsal tubercles; the terminal segment is horny, yellowish-brown; there is a series of conspicuous lateral tubercles and a whitish lateral ridge; all the tubercles emit long yellowish-brown bristles.

The perfect insect appears from the middle of December until the end of January, but is seldom observed. It is extremely inconspicuous when resting on bare tree-trunks. Specimens are occasionally taken at sugar, or disturbed amongst scrub during the day-time.

IZATHA CONVULSELLA.

(Gelechia convulsella, Walk., Cat., xxix., 656; Semiocosma paraneura, Meyr., Trans. N.Z. Inst., xxiv., 219.)

(Plate XXXI., fig. 1 ♀.)

This small and rather inconspicuous species has occurred at Palmerston North, Otaki, Wellington, Christchurch, Lake Wakatipu, and Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are rather narrow with the termen oblique, dull bluish-grey irregularly speckled with black and with white markings; there is a dark basal patch; a rather broad, curved, white band from the costa at about $\frac{1}{2}$; a very indefinite darker central band; an indistinct whitish line from $\frac{2}{3}$ of the costa to the tornus; there are three or four small black marks in the disc before the middle; a black spot beyond the middle and a much fainter spot before the apex; a series of marginal dots extend from the costa at about $\frac{1}{4}$ to the tornus. The hind-wings are greyish-ochreous, darker towards the apex and termen.

The larva, which lives under the scales of the bark of Rimu trees (*Dacrydium cupressinum*), is about $\frac{1}{2}$ inch in length, stout with a horny dark brown head and two horny plates on the second segment. The rest of the body is dull yellowish-brown with six rows of horny warts each emitting a long bristle.

The perfect insect appears about the end of October and is met with until the middle of December. It is usually discovered resting on fences or tree-trunks, but is now a rather rare insect, having apparently decreased in numbers during the last 25 years. Mr. Meyrick remarks that this species "differs from all others of the genus in having vein 9 of the fore-wings rising out of the stalk of 7 and 8 instead of separately; but as it agrees in all other structural characters, it is neither necessary nor expedient to form a new genus for its reception."

IZATHA PHAEOPTILA.

(Trachypepla phaeoptila, Meyr., Trans. Ent. Soc. Lond.; 1905, 236.)

(Plate XXXI., fig. 27 ♂.)

This very inconspicuous-looking species has occurred near Mount Holdsworth and in the neighbourhood of Wellington.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are brown, irregularly strewn with white, ochreous-brown and black scales; the markings are very indefinite; there is a blackish basal patch on the dorsum, a large irregular blackish blotch near the middle of the costa, some raised tufts in the disc, an obscure ochreous-brown patch beyond these followed by a very indefinite, somewhat crescentic whitish mark. The hind-wings are brown, paler towards the base.

The larva, which feeds on lichens (?) growing on tree-trunks, is about $\frac{1}{2}$ inch in length, cylindrical, slightly tapering posteriorly; the head and second segment are horny dark brown; the rest of the body is pinkish-brown, paler underneath; there are two horny plates on the third segment; a single row of large black warts round the fourth segment; four conspicuous warts on the back of segments five to eleven inclusive and a single wart on each side of those segments; there is a row of indistinct warts round segment twelve; the last segment is black, becoming yellowish-brown at its extremity; there are numerous crooked brown bristles which arise from the warts.

The perfect insect appears in February and March, and is found in forest. It often enters houses.

IZATHA AMORBAS.

(Zirosaris amorbas, Meyr., Trans. N.Z. Inst., xlii., 66; Trachypepla amorbas, ibid., xliii., 66.)

(Plate XXXII., fig. 7 ♀.)

This obscure-looking insect was discovered by Mr. J. H. Lewis at Broken River, Canterbury. It has also occurred at Pieton, Nelson, St. Leonards, near Dunedin, Kinloch, Lake Wakatipu and Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate with the apex and tornus rounded; dark blackish-grey thickly speckled with paler grey; there are three very obscure darker transverse bands from the costa at about $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$; the discal spots are indistinct consisting of tufts of brownish-ochreous raised scales. The hind-wings are dark brown, sometimes with a pale yellow blotch on the median third of the costa.

The perfect insect appears from November till January, and is found in forest.

Mr. Meyrick states that this species is distinguishable, structurally, from the rest of the genus by the peculiar scaling of the palpi, but it does not seem necessary to separate it.

GROUP B.—EULECHRIADI.

Antennae in male regularly ciliated; vein 7 of fore-wings to apex.

Genus 12.—TRACHYPEPLA, Meyr.

Basal joint of antennae with pecten. Thorax crested or smooth. Fore-wings with tufts of scales. Hind-wings elongate-ovate. (Plate G., figs. 19, 20, 21 neuration and head of *Trachypepla galaxias*.)

This is a very interesting genus, essentially characteristic of New Zealand, although five species are also known from Australia. Its members are mostly of small size and the wing patterns of many of them of extreme beauty. All the species are forest dwellers, and are usually found at rest on fences or tree-trunks. Some clearly mimic the droppings of birds, and the rest moss or lichens.

The larvae may possibly feed on lichens.

We have twenty species in New Zealand. Five confined to the North Island; three to the South Island, and twelve common to both islands.

TRACHYPEPLA LEUCOPLANETIS.

(*Trachypepla leucoplanetis*, Meyr., Trans. N.Z. Inst., xvi., 14.)

(Plate XXXI., fig. 11 ♂.)

This very beautiful little species has occurred at Auckland, Hamilton, Waimarino, Wellington, Otira River, and on the lower slopes of Mount Arthur to 3,000 feet.

The expansion of the wings is about $\frac{1}{2}$ inch. *The fore-wings are rather short with the termen obliquely rounded; cream-coloured; there is a small, oblique, dark brown costal patch at the base; a large irregular branching central patch composed of blackish-grey and warm brown interspersed with the ground colour; a small grey costal patch before the apex and a faint sub-terminal bluish shading, sometimes containing two or three blackish dots. The hind-wings and the cilia of all the wings are rather dark grey. The head and thorax are dark brown; there is a white patch on the posterior portion of the thorax; the abdomen is grey, darker towards the extremity.*

There is considerable variation in the details of the large central marking on the fore-wings, portions of the edges of which are sometimes detached, thus giving rise to separate spots. In freshly-emerged specimens several small steely-blue patches are also visible in this marking. Mr. Meyrick points out that this is the smallest and proportionally the shortest-winged species of the genus.

The perfect insect appears at the end of November and may be met with until January. It frequents forest, but is rarely found. When resting with closed wings on a leaf, or twig, the general appearance of the insect is strongly suggestive of a small bird-dropping, and this resemblance is no doubt highly protective.

TRACHYPEPLA SEMILAUTA.

(*Trachypepla semilauta*, Philp., Trans. N.Z. Inst., i., 129.)

(Plate XXXVIII., fig. 18 ♀.)

This beautiful species was discovered by Mr. Philpott on Mount Cleughearn, Hunter Mountains, at an elevation of about 2,700 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. *The fore-wings are cream-coloured with conspicuous black and yellowish-brown markings; there is a small black basal patch, considerably extended on the costa and slightly so on the dorsum; two small black spots in the disc before the middle; a large triangular black mark on the costa beyond the middle with a large white centred black spot near its apex and a curved black sub-terminal band broadest on the costa; there is a large yellowish-brown blotch in the disc beyond the middle and an irregular terminal band of the same colour; the cilia are pale yellowish-brown mixed with blackish. The hind-wings are dark greyish-brown. The head and palpi are yellowish; the thorax purplish-grey and the abdomen dark yellowish-brown.*

The perfect insect appears in January, and may be looked for in beech forests on mountains in the far south.

Described and figured from a specimen in Mr. Philpott's collection.

TRACHYPEPLA EURYLEUCOTA.

(*Trachypepla euryleucota*, Meyr., Trans. N.Z. Inst., xvi., 14.)

(Plate XXXI., fig. 10 ♂.)

This very striking little insect has occurred at Kaeo, Auckland, Cambridge, Raurimu, Wellington, Dunedin and Invercargill. Although not very common it is probably generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. *The fore-wings are elongate, very dark glossy purplish-brown sparsely speckled with paler brown; there is a large, creamy-white basal patch with a small purplish-brown mark at the extreme base of the costa; there are two oval patches of raised scales in the disc before and beyond the middle; a wavy, pale bluish-white band from the costa before the apex to about the middle of the termen, very broad on the costa and very narrow towards the termen. The hind-wings are brownish-grey. The head, palpi, and extreme anterior margin of the thorax are dark purplish-brown; the thorax cream-coloured and the abdomen dull orange-brown tipped with dark brown.*

There is slight variation in the depth of the ground colour, portions of which, in some specimens, have steely-blue reflections.

The perfect insect appears in December and January. It seems to frequent rather open situations and is usually found resting on walls or fences, but is not a common species. When thus at rest its resemblance to a bird-dropping is extremely perfect.

TRACHYPEPLA CONSPICUELLA.

(*Gelechia conspicuella*, Walk., Brit. Mus. Cat., xxix., 651; *Gelechia taongella*, Feld., Reis. Nov., Pl. cxl., 45; *Trachypepla conspicuella*, Meyr., Trans. N.Z. Inst., xvi., 15.)

(Plate XXXI., fig. 8 ♀.)

This rather dull-looking species has occurred at Wellington, Christchurch and Lake Wakatipu. It is very common at Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. In general appearance it is lighter than *T. curyleucota* with less distinct markings. The thorax is brownish-grey; the white basal patch much smaller, not reaching to the dorsum; the dorsal half of the fore-wing is more or less clouded with pale ochreous-brown; there are two very prominent tufts of raised scales just beyond the basal patch, and two oblique black marks in the disc beyond the middle. The hind-wings are greyish-ochreous.

This species varies considerably in the depth of the general colouring. Although some of the darker individuals closely resemble *T. curyleucota* they may be immediately recognised by the brown thorax and smaller white basal patch.

The perfect insect appears from November till February. It is very commonly met with resting on walls and fences, and is often found drowned in vessels of water which have been left exposed in the open air. It also frequently enters houses. Like the last species its colouring is specially imitative of bird-droppings.

TRACHYPEPLA AMPHILEUCA.

(*Trachypepla amphileuca*, Meyr., Trans. N.Z. Inst., xlv., 107.)

(Plate XXXI., fig. 9 ♀.)

This clearly-marked species has occurred at several localities near Wellington, but is rarely met with.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The head is brown, the thorax white and the abdomen brownish-ochreous. The fore-wings have the basal third snow white, the middle third purplish-brown and the apical third snow white; there is a narrow blackish-brown wedge-shaped mark on the costa at the base; four reddish-brown blotches, a tuft of white scales and two tufts of black scales in the disc; a faint triangular patch of pale purplish-brown scales in the apical third and a terminal series of ill-defined blackish spots. The hind-wings are whitish-ochreous shaded with grey towards the apex and termen. This species is very like *T. curyleucota*, from which it may be readily distinguished by the posterior third of the costa being wholly white.

The perfect insect appears in December and January, and is found in forest. Its general wing-pattern clearly imitates bird-droppings.

TRACHYPEPLA HIEROPIS.

(*Trachypepla hieropis*, Meyr., Trans. N.Z. Inst., xxiv., 218.)

(Plate XXXI., fig. 3 ♀.)

This very elegant and distinct species was discovered at Wellington in 1889 and up to the present time it has not been recorded from any other district.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate with the termen very obliquely rounded; snow-white with brown markings; there is a small dark brown patch on the costa at the base; a very narrow patch on the costa near the middle; a large paler brown blotch on the dorsum before the tornus followed by several smaller indistinct markings; there is a sub-terminal series of small brown spots, interspersed with a few steely blue scales, not reaching to the costa and three or four black spots near the apex. The hind-wings are brownish-grey. The head, neck, palpi and antennae are dark brown, the thorax snow-white and the abdomen pale brown.

The perfect insect appears in December and frequents forest, but is seldom met with.

TRACHYPEPLA GALAXIAS.

(*Trachypepla galaxias*, Meyr., Trans. N.Z. Inst., xvi., 17.)

(Plate XXXI., fig. 28 ♀.)

This very pretty species seems to be common and generally distributed throughout the country.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate with the apex rounded and the termen very obliquely rounded; white with blackish-grey markings; there is a rather irregular basal patch enclosing one or two small white patches and having on its outer edge two projections and two tufts of black raised scales; a large triangular mark on the costa near the middle with a black-edged reddish-brown spot at its apex, connected with the dorsum by a fine twice dentate blackish line; there is a cloudy grey patch on the costa at $\frac{1}{4}$ and another on the termen below the apex; a slender wavy line connects the costal spot with the tornus. The hind-wings are grey, darker near the apex and termen. The head is white.

In some specimens the blackish-grey markings of the fore-wings are paler and more diffused than in others.

The perfect insect appears from November till February, and frequents forest, where it is often common. Its colouring is imitative of black and white lichens and is highly protective when the insect is at rest on tree-trunks, which is its usual habit.

TRACHYPEPLA SPARTODETA.

(*Trachypepla spartodeta*, Meyr., Trans. N.Z. Inst., xvi., 16.)

(Plate XXXI., fig. 2 ♀.)

This obscurely-marked species has occurred at Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the apex pointed and the termen hardly rounded and very oblique; pale purplish-brown with dull white and reddish-brown markings; there is a strongly angulated transverse line from about $\frac{1}{3}$ of the costa to $\frac{1}{2}$ of the dorsum, reddish-brown in the middle with two patches of blackish raised scales; this is usually followed by a dull white central band and another patch of reddish-brown; there is a fine, doubly curved sub-terminal line. The hind-wings are pale greyish-brown.

There is considerable variation in the intensity of the markings and in the extent of the reddish-brown colouring.

The perfect insect appears in December and January, and frequents forest. It is rather a rare species.

TRACHYPEPLA INGENUA.

(*Trachypepla ingenua*, Meyr., Trans. N.Z. Inst., xliii., 65.)

(Plate XXXI., fig. 4 ♂.)

This handsome insect, which is one of the largest species of the genus at present known, was discovered at the Otira River in December, 1908. It has also occurred on Mount Arthur at an elevation of 3,500 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are rather elongate with the apex rounded and the termen obliquely rounded; white; there is a large purplish-black basal patch extending to about $\frac{1}{3}$; a large triangular patch on the costa near the middle extending about half-way across the wing and having at its apex a large brown and white discal spot; a strongly angulated sub-terminal line leaving a clear white apical patch; be-

tween the discal spot and the sub-terminal line the wing is thickly sprinkled with white, grey and bluish scales. The hind-wings are dull greyish-ochreous. The head and thorax are dark grey and the abdomen orange-brown.

The perfect insect appears in December, and frequents forest. It is probably very local. In general colouring it imitates bird-droppings, but it is strikingly distinct from all the other species having similar imitative tendencies.

TRACHYPEPLA CONTRITELLA.

(*Gelechia contritella*, Walk., Cat. xxix., 657; *Trachypepla nyc-topis*, Meyr., Trans. N.Z. Inst., xvi., 16.)

(Plate XXXI., fig. 5 ♂.)

This dull-coloured though distinct species is common and generally distributed throughout the country.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate with the apex rounded and the termen very oblique; pale purplish-grey; there is a conspicuous outwards-curved thick blackish transverse line with two tufts of raised scales at about $\frac{1}{4}$, rather indistinct on the costa and dorsum; beyond this there is usually a paler central area; another oblique transverse line is situated on the costa at about $\frac{1}{2}$ and encloses two tufts of raised scales; there is a wavy transverse line from the costa at $\frac{3}{4}$ to the tornus and a series of indistinct terminal dots. The hind-wings are greyish-ochreous, darker towards the apex.

This species varies much in the depth of the ground colour, and in the intensity of the markings. The pale central area of the fore-wings is also variable.

The perfect insect appears in January, and frequents forest. In the South Island it is often very common in beech forests (*Nothofagus*), but being inconspicuous seldom attracts much attention. Its colouring is imitative of dull grey lichens.

TRACHYPEPLA PROTOCHLORA.

(*Trachypepla protochlora*, Meyr., Trans. N.Z. Inst., xvi., 18.)

(Plate XXXI., fig. 23 ♀.)

This species has occurred at Waimarino, Mount Egmont, Palmerston North, Wellington, Otira Gorge and Invercargill. It seems to be very rare in the North Island, but comparatively common in the extreme south of the South Island.

The expansion of the wings is about $\frac{3}{4}$ inch. In its general markings this insect closely resembles *T. galaxias* but may be immediately distinguished from that species by its green colouring. The fore-wings have the apex rounded and the termen oblique; rather dull yellowish-green with black markings narrowly edged with white; there is a cloudy grey patch on the costa at the base; two patches of black raised scales in the disc at $\frac{1}{4}$, the upper one strongly angulated outwards; an indefinite triangular patch on the costa near the middle touching two large, black-edged discal spots; the upper spot centred with raised green scales, the lower with white scales, an obscure wavy line connects the lower spot with the dorsum; there is a small spot on the costa at $\frac{3}{4}$ emitting a fine wavy sub-terminal line followed by an indistinct terminal shading and two or three terminal dots. The hind-wings are grey.

This species seems to vary a little in the depth of the green ground colour and strength of the markings.

The perfect insect appears from November till February, and frequents forest. Its colouring is highly protective when it is resting amongst moss or on green lichens. In this position the wings are tightly closed, almost flat, with their apices overlapping; the antennae are placed under the costal margin of each wing; the anterior legs are placed forwards, the middle legs somewhat backwards and the hind-legs hidden.

TRACHYPEPLA ASPIDEPHORA.

(*Trachypepla aspidophora*, Meyr., Trans. N.Z. Inst., xvi., 19.)

(Plate XXXI., fig. 24 ♀.)

This very distinct little species has occurred commonly at Kaero, north of Auckland, Auckland, Wellington, Nelson, the lower slopes of Mount Arthur to 3,200 feet, Christchurch, Dunedin, and Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are dull whitish-ochreous mottled with brownish-ochreous. There is an oblique ochreous-brown mark in the disc near the middle; two tufts of raised ochreous scales; an angulated blackish line a little before the middle; a very large irregular patch on the costa from about $\frac{1}{4}$ to near the apex containing:—two tufts of raised pale ochreous scales, a black and a brown mark on the costa, one large black spot in the disc followed by a small slaty-blue spot; there is a short cloudy terminal band not reaching the apex. The hind-wings are greyish-ochreous.

The perfect insect appears in December and January, and is usually met with on tree-trunks, where its colouring closely approximates to that of many lichens.

TRACHYPEPLA ROSEATA.

(*Trachypepla roseata*, Philp., Trans. N.Z. Inst., liv., 152.)

(Plate XLIX., fig. 22 ♀.)

This rather inconspicuous species has occurred at Takaka and on the Dun Mountain near Nelson.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are very pale ochreous white; there is a minute blackish patch on the costa near the base; a much larger pale brownish-grey patch near the middle of the dorsum reaching more than half way across the wing; the apical third is wholly brownish-grey traversed by an irregular dark margined whitish sub-terminal line; the centre of the apical patch is black and there are a few scattered bluish-white scales inside the sub-terminal line; four tufts of pinkish raised scales are situated in the disc; the cilia are brownish-grey mixed with blackish. The hind-wings and cilia are grey.

This species is nearest to *Trachypepla aspidophora*, but apparently quite distinct from that species.

The perfect insect appears in January and frequents forest.

TRACHYPEPLA VINARIA.

(*Trachypepla vinaria*, Meyr., Trans. N.Z. Inst., xlvii., 108.)

(Plate XXXII., fig. 26 ♀.)

This very obscure species has occurred at Wellington, Mount Arthur, Arthur's Pass, and the Otira River.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dull white more or less speckled with pale grey and dull purple; there is a blackish-brown spot near the base; a sec-

and very obscure patch on the costa at about two-fifths and a third slightly beyond the middle; two blackish-brown spots are situated in the disc before the middle; the costa is often more or less clouded with dull red and the basal area with dull purplish-grey; there is a very large patch of the pale ground colour in the middle of the wing; an irregular triangular patch of purplish-grey with its apex touching the tornus bounded by white-edged blackish lines; a paler terminal patch. The hind-wings are dull grey.

This species varies considerably in the intensity of the markings, which are often very indistinct. Occasionally the pale ground colour is predominant.

The perfect insect appears in December and January, and frequents forest. It is evidently a very local species and owing to its inconspicuous appearance is no doubt often overlooked.

TRACHYPEPLA IMPORTUNA.

(*Trachypepla importuna*, Meyr., Trans. N.Z. Inst., xvi., 108.)

This very obscure species apparently differs from *T. vinaria* in the shorter antennal ciliations of the male and absence of distinct purplish-tinge in the darker markings. I am unable to identify it with certainty.

TRACHYPEPLA PHOTINELLA.

(*Eulechria photinella*, Meyr., Proc. Linn. Soc. N.S.W., 1882, 541, Trans. N.Z. Inst., xvi., 9; *Trachypepla photinella* ib. 1., 134.)

(Plate XLVI., fig. 8 ♂.)

This very obscure species has occurred at Wellington, Wainuiomata and D'Urville Island.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate-ovate with the termen rounded and very oblique, rather dull white with indefinite dull purplish-grey and brownish-grey markings; there is an elongate patch on the costa at the base; two discal spots at $\frac{1}{4}$ and $\frac{3}{4}$; a triangular patch of brownish-grey scales on the middle of the dorsum; the whole of the apical area is irregularly sprinkled with dull purplish-grey and there is a strongly curved fine blackish sub-terminal line. The hind-wings are pale brownish-ochreous, heavily sprinkled with darker brown scales. The cilia of all the wings are pale brownish-ochreous mixed with darker.

The perfect insect appears in January, and is found in forests.

TRACHYPEPLA INDOLESCENS.

(*Trachypepla indolenscens*, Meyr., Trans. N.Z. Inst., lvii., 700.)

(Plate L., fig. 14 ♂.)

A single specimen of this species has occurred at Karori.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings, which have the costa gently arched and the termen very obliquely rounded, are white with dull brown markings; a suffused basal patch; two very distinct spots in disc at $\frac{1}{4}$, one on fold, the other immediately above fold; two suffused brownish patches on costa and dorsum, meeting near middle, leaving a curved white transverse band between these and the basal patch; a conspicuous discal spot beyond middle, followed by a doubly-curved transverse band from costa at $\frac{1}{4}$ to tornus; a series of brown dots along outer third of costa and on termen. The hind-

wings are pale brownish-grey. All the cilia are pale brownish-grey with a faint dusky line.

The perfect insect appears in February, and frequents scrub.

TRACHYPEPLA LICHENODES.

(*Trachypepla lichenodes*, Meyr., Trans. N.Z. Inst., xvi., 20; *ibid.*, xliii., 66.)

(Plate XXXI., figs. 25, 26 ♀ varieties.)

This variable species has occurred at Wellington, Nelson, Castle Hill, Bealey River and Otira River.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are moderately broad; very dark purplish-brown more or less speckled with black and mottled with yellow; there are two small patches of orange-yellow at the base; a yellow patch on the costa at about $\frac{1}{4}$ and a larger patch on the dorsum before the tornus; a small patch on the costa at $\frac{3}{4}$; a broad yellow sub-terminal band joining the tornal patch; the edges of all the yellow markings are usually speckled with black; the cilia are black with a broad yellow bar below the apex. The hind-wings and cilia are blackish-grey. The head, palpi and collar are yellow.

There is great variation in the extent and depth of the yellow markings which sometimes extend over the major portion of the fore-wings, and in such specimens the usual dark discal spots are very clearly visible.

The perfect insect appears in December and January, and frequents forest, but is not generally common. Its colouring imitates black and yellow lichens and is highly protective in consequence.

TRACHYPEPLA ANASTRELLA.

(*Trachypepla anastrella*, Meyr., Trans. N.Z. Inst., xvi., 19.)

(Plate XXXI., fig. 12 ♂.)

This very obscurely-marked species has occurred at Raurimu, Ohakune, Wellington, Nelson, Christchurch, Otira River, Dunedin and Invercargill. It is probably common and generally distributed throughout the country.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are rather dull pinkish-brown with indistinct darker brown markings; there is a short oblique transverse band at the base; a second broader band on the costa at about $\frac{1}{4}$ ending in two dark reddish-brown spots near the fold; a third fainter band at about $\frac{3}{4}$ joining a large indistinct patch on the termen and traversing a reddish-brown discal spot; a fourth very obscure band is situated near the apex. The hind-wings are greyish-brown, darker near the apex and termen.

In some specimens the spaces between the three basal bands are more or less clouded with dull whitish-ochreous, thus causing the dark markings to vary considerably in distinctness.

The perfect insect appears from November till March. It is common amongst scrubby forest, but owing to its extremely inconspicuous appearance is no doubt often overlooked. It occasionally flies freely in hot sunshine.

TRACHYPEPLA EUMENOPA.

(*Trachypepla eumenopa*, Meyr., Trans. N.Z. Inst., lvi., 416.)

(Plate XXX., fig. 6.)

This very richly-coloured little species has occurred amongst tree ferns at Wainuiomata, near Wellington.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are dull purplish, very thickly overlaid with blackish and orange-brown scales; a heavy sprinkling of black scales on basal third of costa; two clusters of orange-brown and yellow raised scales in disc at $\frac{1}{2}$, a large patch of bright brown around these; a curved band of dull whitish scales from middle of costa to beyond middle of dorsum; a large discal spot consisting of pale yellow, orange-brown, and black raised scales; above this spot there is a patch of very rich brown, and below it a patch of bright orange-brown; the apical area is purplish-brown; there is a whitish sub-terminal line and a black terminal line; the cilia are yellowish-brown. The hind-wings and cilia are brownish-black.

The perfect insect appears in December.

Genus 13.—COROCOSMA, Meyr.

Head with appressed scales; ocelli posterior; tongue developed. Antennae $\frac{1}{2}$ (in δ probably with long ciliations), basal joint moderate, with narrow pecten. Labial palpi moderate, curved, ascending, slender, second joint loosely scaled beneath, terminal joint shorter than second, pointed. Maxillary palpi rudimentary. Thorax with posterior crest. Posterior tibiae rough-scaled above with whorls of projecting scales on origin of spurs. Fore-wings with large tufts of scales on surface; vein 1b furcate, 2 from near angle, 7 absent, 11 from middle. Hind-wings under 1, elongate-ovate, cilia 1; veins 3 and 4 connate, 5-7 somewhat approximated towards base.

Allied to the remarkable Australian genus *Petalanthes*, of which it appears to be a development, differing in the absence of vein 7 and reduction of terminal joint of palpi; it belongs to the group of *Trachypepla*. I infer, therefore, that it is to be included in that portion of the New Zealand fauna which immigrated from Queensland by way of New Caledonia (Meyrick).

Only one species is known at present.

COROCOSMA MEMORABILIS.

(*Corocosma memorabilis*, Meyr., Trans. N.Z. Inst., lvii., 700.)

(Plate LII., fig. 12 φ .)

This stoutly-built, refulgent little insect was discovered by Stella Hudson, at Shedwood Forest, Tapawera, near Nelson.

The expansion of the wings is five-sixteenths of an inch. The fore-wings are rather broad, with the termen obliquely rounded; purplish-bronze; there is a small black area at the base; two elongate black spots in disc before middle, each containing several silvery metallic scales; a cluster of coppery-metallic scales in disc beyond middle; a strongly angulated black sub-terminal line, broadly margined with whitish towards base; the cilia are blackish, with the tips coppery-metallic. The hind-wings and cilia are dark brown.

Of this species Mr. Meyrick says: "This seemingly obscure, but really beautiful little insect (the smallest of the 164 New Zealand *Oecophorides*) is probably adapted by its complex marking and rough scaling for concealment on tree-trunks, and by its bright metallic and coppery ornamentation for flying in sunshine, both these habits being characteristic of the species of *Petalanthes* also."

The perfect insect appears in January and may be looked for in forest.

Genus 14.—ATOMOTRICHIA, Meyr.

Antennae in δ with whorls of long cilia, basal joint with pecten. Thorax smooth. Fore-wings with small tufts of scales. Hind-wings elongate-ovate. Wings in φ usually abbreviated or aborted. (Plate G., fig. 24, head of *Atomotrichia isogama*.)

Nine species have been recorded in New Zealand. Three confined to the North Island; four to the South Island, and two common to both islands.

This very interesting endemic genus presents exceptional difficulties to the student, especially in respect of those forms having semi-apterous females. The markings and general coloration are so variable that but little reliance can be placed on these characters. Nothing is at present known regarding the life-histories of these remarkable insects and the entire genus offers a most promising field to the enterprising investigator.

ATOMOTRICHIA VERSUTA.

(*Atomotrichia versuta*, Meyr., Trans. N.Z. Inst., xlv., 109.)

(Plate XXXI., figs. 18, 19, 20 δ varieties; 7, 14, 21 φ varieties.)

This interesting species has occurred plentifully at Karori, near Wellington.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches, of the female about $\frac{3}{4}$ inch. The fore-wings of the male are elongate with the apex obtuse and the termen very obliquely rounded; there are three principal varieties connected by numerous intermediate forms; these may be briefly described as follows:—

- (1.) Fore-wings bright ochreous-brown with blackish central stripe and terminal dots.
- (2.) Fore-wings pale ochreous-brown with brown discal marks before and beyond middle; a very strongly angulated transverse line at $\frac{1}{2}$ and a series of faint terminal spots.
- (3.) Same as 2 but the whole of the fore-wings, except a broad dorsal stripe, clouded with dull brown. This form varies much in the general depth of the colouring, the fore-wings of some specimens being more or less clouded with dull black.

In all the varieties the hind-wings are pale ochreous, tinged with grey in the darker forms; there is often a series of faint terminal dots on the cilia. The female has the fore-wings abbreviated and quite incapable of flight and the hind-wings rudimentary; the same varieties occur as in the male, but the general colouring is duller and the markings less distinct; the fore-wings are extremely pointed at the apex.

The perfect insect appears in August and September. The females are found at night resting on fences, where they appear to be unaffected by either cold winds or frost. The males also occur in the same situations but seem to be less plentiful.

ATOMOTRICHIA OMMATIAS.

(*Atomotrichia ommatias*, Meyr., Trans. N.Z. Inst., xvi., 10;

ibid., xlv., 109.)

This species, which is extremely closely allied to *A. versuta*, has occurred in Christchurch.

It is stated to be distinguished from that species by the broader wings of the male and the more fully developed hind-wings of the female.

The perfect insect appears in August and September and has been found at rest on tree-trunks and fences.

ATOMOTRICHA CHLORONOTA.

(*Atomotricha chloronota*, Meyr., Trans. N.Z. Inst., xli., 110.)

This is another species very closely resembling *A. versuta*. It is stated to have the antennal joints four times as long as their apical width, those in *A. versuta* being thrice as long. The hind-wings of the female are rudimentary.

Mr. Philpott states that this species is plentiful at Invercargill during the spring and comes readily to sugar.

ATOMOTRICHA OECONOMA.

(*Atomotricha oeconomia*, Meyr., Trans. N.Z. Inst., xli., 110.)
(Plate XXXI., figs. 16, ♂; 22, 29 ♀ varieties.)

This obscure, but interesting species, has occurred at Karori, near Wellington.

The expansion of the wings of the male varies from a little over $\frac{1}{2}$ to $\frac{3}{4}$ inch; of the female slightly under $\frac{1}{2}$ inch. The male differs from the same sex in *A. versuta*, *A. ommatias* and *A. chloronota* in having the wings considerably narrower and the palpi much shorter, the second joint not nearly reaching the base of the antennae. The fore-wings are usually pale brownish-ochreous, but a darker form occurs having the fore-wings strongly clouded and speckled with black; there is often an obscure, curved transverse line from $\frac{1}{4}$ of the costa to $\frac{1}{4}$ of the dorsum and a crescentic mark in the disc at $\frac{1}{4}$ is sometimes visible as well as two pale centred spots near the base. The female, which was discovered by Mr. Sunley, has the fore-wings extremely small, only about half as long as the body; pale greyish-ochreous with a few black dots and several irregular curved black marks. The hind-wings are rudimentary. It is wholly incapable of flight.

Mr. Sunley informs me that the perfect insect first appears about the beginning of June. At this time the semi-apterous females may be found resting on fences during the coldest nights. The males are found in the same situations but are apparently much rarer. This species is remarkable in being abroad in the perfect state during the depth of winter, no specimens occurring later than the middle of August.

ATOMOTRICHA SORDIDA.

(*Oecophora sordida*, Butl., Proc. Zool. Soc. Lond., 1877, 405;
Brachysara sordida, Meyr., Trans. N.Z. Inst., xvi., 11;
Atomotricha sordida, ibid., xli., 110.)
(Plate XXXI., fig. 15 ♂.)

This species, which is extremely similar to *A. oeconomia*, was discovered by Fereday at Rakaia. It is stated to be recognisable by its short palpi and narrow fore-wings, usually with dark median stripe. The female, which has recently been discovered by Dr. J. G. Myers at Darfield, near Christchurch, closely resembles the same sex in *A. oeconomia*, but the aborted fore-wings have a blackish longitudinal streak. The hind-wings are rudimentary.

ATOMOTRICHA EXSOMNIS.

(*Atomotricha exsomnia*, Meyr., Trans. N.Z. Inst., xlv., 26.)
(Plate XXV., fig. 41 ♂.)

This species has occurred on Mount Ruapehu (4,000 feet) and at Ohakune, but appears to be very local.

The expansion of the wings is 1 inch. The fore-wings have the costa considerably arched before the apex and the termen obliquely-rounded; pale ochreous-yellow with brown markings; there is a broad curved streak along the fold from the base to the second discal spot; numerous scattered brown scales on the basal third of the costa; three discal spots; the first above the fold, irregular, ring-shaped, the second inconspicuous, almost directly underneath the first, the third about the middle of the disc, larger, ill-defined and almost touching a patch on the costa; there is an indistinct, inwards-curved, wavy line from the costa at about $\frac{1}{4}$, followed by a clear series of apical and terminal dots. The hind-wings are very pale ochreous-yellow with a faint grey discal spot.

The perfect insect appears from November till January, and is found in forests. It is closely allied to *Atomotricha isogama*, and is possibly winged in both sexes.

ATOMOTRICHA COLLIGATELLA.

(*Atomotricha colligatella*, Walk., Cat., xxix., 768.)

Male: Hoary, rather stout. Palpi smooth, nearly twice longer than the head; third joint setiform, as long as the second. Antennae thickly clothed with long slender hairs. Abdomen extending rather beyond the hind-wings. Hind tibiae stout, fringed. Fore-wings rather broad, minutely brown speckled, slightly acute, with an exterior line composed of irregular blackish dots, and very deeply retracted towards the costa; two blackish points in the disc nearer the base, and a sub-marginal curved line of blackish points; exterior border slightly curved very oblique; underside with a brownish tinge. Length of body 5 lines; of the wings 15 lines.

I am unacquainted with this species. The above is copied from the original description.

ATOMOTRICHA ISOGAMA.

(*Atomotricha isogama*, Meyr., Trans. N.Z. Inst., xli., 13; ibid., xli., 109.)
(Plate XXV., fig. 40.)

This species, which is fully winged in both sexes, has occurred at Wellington and at Greymouth.

The expansion of the wings is slightly under 1 inch. The female has the wings fully developed and formed as in the male. The fore-wings are moderately narrow with the costa rather strongly arched, the apex obtuse and the termen very obliquely rounded; rather bright yellowish-brown paler on the dorsum; there is a very prominent ridge of raised scales at the base; a black spot near the dorsum at about $\frac{1}{4}$; a cloudy patch of darker brown in the middle of the wing, extending from the base and terminating on the costa a little beyond the middle; there is a round, pale-centred spot on the disc at about $\frac{1}{4}$; a much larger one a little beyond the middle with a blackish shading between them; a fine, strongly-curved sub-terminal line and a terminal series of blackish dots. The hind-wings are very pale whitish-ochreous, clouded with grey near the termen, with a rather conspicuous grey discal spot.

There is considerable variation in the depth of the colouring and in some specimens the wings are almost yellow-ochreous.

The perfect insect appears from the middle of September until the middle of November and is sometimes very common. It is rather sluggish in its habits, and mostly frequents gardens and other cultivated places. It is usually found resting on fences or tree-trunks in the daytime, often secreting itself on the under-side of objects almost in contact with the ground. It occasionally enters houses, and is frequently observed drowned in vessels of water which have been left in the open over-night.

ATOMOTRICA PROSPICIENS.

(*Atomotricha prospiciens*, Meyr., Trans. N.Z. Inst., lv., 662.)

(Plate LI., fig. 1 ♂, 2 ♀.)

This rather bright-looking species has been taken by Mr. C. E. Clarke at Pompolona, Te Anau-Milford Track, and at Orepuki, Southland.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are bright yellowish-brown, paler around the markings, the markings themselves being blackish-brown; there are several elongate marks along the fold; the two discal stigmata are very large, strongly outlined in black towards costa; the second line is very strongly angulated outwards below costa, thence strongly inwardly oblique. The hind-wings are pale ochreous.

The perfect insect appears from October till December.

Genus 15.—BAREA, Walk.

Basal joint of antennae without pecten. Thorax with strong crest. Fore-wings without tufts. Hind-wings elongate-ovate. (Plate G., fig. 30 head of *Barea dinocosma*.)

A considerable Australian genus. The larvae probably feed in bark of trees. We have four species in New Zealand.

BAREA DINOCOSMA.

(*Phloeopola dinocosma*, Meyr., Proc. Linn. Soc. N.S.W. 1883, 349; Trans. N.Z. Inst., xvi., 12.)

(Plate XXXII., fig. 10 ♀.)

At present this rather distinctly-marked species has only been recorded from Auckland, Raurimu, Ohakune and Wellington.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are moderately broad with the apex and tornus rather rounded; bronzy-brown with golden reflections; there is a black spot on the costa at the base and a smaller spot on the dorsum; two small spots obliquely placed in the disc at about $\frac{1}{4}$; a very large kidney-shaped black spot in the disc beyond the middle followed by a narrow outwards-curved ochreous transverse line; beyond this line the ground colour of the wing is much paler; there are three black dots on the costa near the apex and a series of similar dots on the termen. The hind-wings are pale grey, whiter near the base with a darker grey lunule near the middle of the disc.

The perfect insect appears in November and December, frequenting the densest parts of the forest where it may sometimes be dislodged from amongst masses of *Astelia solandri*, a plant often growing on dead trees in such situations. It is rare and of obscure and very secluded habits.

BAREA AMBIGUA.

(*Barea ambigua*, Philp. Trans. N.Z. Inst., lvi., 396.)

(Plate LII., fig. 15 ♂.)

This species was discovered by Mr. W. Heighway, at Horseshoe Lake, near Christchurch.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are elongate-oblong; dull brownish-ochreous, irregularly sprinkled with blackish-grey; two small black marks on costa and dorsum at base; two small, somewhat horse-shoe-shaped, black marks, one on fold, the other immediately above fold; a very large, irregular kidney-shaped discal spot; a diffused somewhat triangular blotch from apex, almost reaching the discal spot; four small elongate blackish terminal markings; the cilia are greyish-ochreous. The hind-wings and cilia are dull greyish-ochreous.

This species closely resembles *B. dinocosma*, from which it differs in its slightly larger size and much darker and generally greyer colouring of both fore- and hind-wings.

The perfect insect appears in November.

BAREA CONFUSELLA.

(*Barea confusella*, Walk., Cat. xxix., 682; *Phloeopola confusella*, Meyr., Proc. Linn. Soc. N.S. Wales 1883, 354.)

(Plate XXXII., fig. 11 ♀.)

This common Australian insect was first observed at Wellington and Nelson about the year 1908. It has no doubt been artificially introduced. Specimens have also been taken at New Plymouth, Christchurch, Dunedin and on Bold Peak, Lake Wakatipu.

The expansion of the wings is about 1 inch. The fore-wings are very pale golden-ochreous with confused black markings; there is a very broad wavy oblique bar on the costa near the base almost reaching the dorsum; a much smaller indistinct bar beyond this; two discal dots; a large cloudy V-shaped mark on the outer half of the costa, the point of the V touching the tornus and a series of indistinct sub-terminal spots; the spaces between all these markings are thickly sprinkled with blackish scales. The hind-wings are greyish-ochreous, darker towards the apex.

The perfect insect appears in January and February, and is found in gardens, resting on tree-trunks by day, or feasting on blossoms at night. In Australia it is attached to *Eucalyptus*. The New Zealand specimens belong to the Victorian form with grey hind-wings, the New South Wales form having them pale yellowish.

BAREA EXARCHA.

(*Barea exarcha*, Meyr., Proc. Linn. Soc. N.S.W., viii., 357; *Izatha planetella*, Huds., Ent. Mo. Mag., lix., 218.)

(Plate LI., fig. 20 ♀.)

This large and conspicuous species has occurred in the North Island at Ohakune, and in the South Island at Christchurch and Dean's Bush. It has probably been introduced from Australia through human agency.

The expansion of the wings of the female is almost $1\frac{1}{2}$ inches. The fore-wings are elongate-oblong, with the apex and tornus rounded; pale ochreous-brown, irregularly clouded with patches of darker brown, with black markings; there is a large, rather yellowish-brown, crescentic band, around apex, termen and tornus, its inner edge irregularly margined with black; two rather faint blackish patches on costa at $\frac{1}{4}$ and $\frac{3}{4}$; a minute black

spot in the disc at $\frac{1}{2}$; a distinct longitudinal black bar following this; a large, well-defined, round black discal spot at $\frac{3}{4}$; the cilia are ochreous-brown, faintly barred with blackish. The hind-wings and cilia are pale ochreous-grey.

According to M. Tonnoir the larva feeds in hardwood.

Described and figured from a specimen kindly submitted by Mr. S. Lindsay. I am also indebted to Mr. Philpott for identifying the insect as *Barea exarcha*.

Genus 16.—EULECHRIA, Meyr.

Basal joint of antennae with pecten. Thorax smooth. Fore-wings without tufts. Hind-wings elongate-ovate.

A very large Australian genus represented in New Zealand by one species only.

The larvae are wood-borers, feeding within the dead branches of trees during the autumn and winter.

EULECHRIA ZOPHOËSSA.

(*Eulechria zophocssa*, Meyr., Proc. Linn. Soc. N.S.W., 1882, 515; Trans. N.Z. Inst., xvi., 8.)

(Plate XXXII., fig. 27 ♀; Plate III., fig. 14 larva.)

This very obscurely-marked dull-looking insect has occurred at Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather broad with the termen very oblique; dull ochreous thickly covered with scattered brown and dull reddish scales, especially towards the terminal area; there are distinct dark brown costal blotches at the base, slightly beyond $\frac{1}{2}$, and before the apex; a blackish patch on the dorsum at the base; three brown discal dots near the middle and one on the fold; a sub-terminal series of brown dots and a terminal series of blackish marks. The hind-wings are greyish-brown.

The larva, which tunnels the dead branches of the common fuchsia (*Fuchsia excorticata*) during the autumn and winter, lives in an extremely tough, tight-fitting silken tube covered on the outside with minute particles of decayed wood. This tube is in fact so tough that an enemy would have great difficulty in extracting the enclosed larva. The length of this larva when full-grown is about $\frac{1}{4}$ inch; it is cylindrical and extremely slender; the head is minute, reddish-brown; the second segment also minute blackish-brown and polished; the third segment is slightly swollen with a blackish horny plate on each side; the fourth segment is soft, brownish yellow; the rest of the larva is brownish-yellow, with the segmental divisions clearly marked in blackish-brown; the whole larva has a somewhat velvety appearance; the last two segments are much shorter than the others, the terminal segment being blackish-brown and horny.

The pupa is enclosed in a silken tube within one of the burrows eaten out by the larva.

The perfect insect appears in December and January, and frequents rather dry scrubby forest, but is seldom observed. Its colouring is specially adapted for concealment whilst resting on dead fuchsia stems, where it is practically invisible, and this fact probably accounts for its apparent rarity.

Genus 17.—LOCHEUTIS, Meyr.

Characters same as *Eulechria* but antennae without basal pecten. There are three Tasmanian species, and one in Ceylon. We have one species in New Zealand.

LOCHEUTIS VAGATA.

(*Locheutis vagata*, Meyr., Trans. N.Z. Inst., xlviii., 416.)

(Plate XXIX., fig. 7 ♂.)

This very obscure-looking insect was discovered by Mr. R. M. Sunley on Mount Holdsworth, at an elevation of about 3,000 feet above the sea-level. It has also occurred on Mount Egmont and Mount Arthur.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather narrow with the apex obtuse and the termen very obliquely rounded; dull brownish-black with slight bronzy reflections. The hind-wings are the same colour as the fore-wings. The antennae are furnished with long ciliations (nearly 4).

The perfect insect appears in November.

GROUP C. PHILOBOTIDI.

Antennae in ♂ regularly ciliated; 7 of fore-wings to termen.

Genus 18.—PAROCYSTOLA, Turner.

Head with appressed scales, side tufts spreading; ocelli posterior; tongue developed. Antennae 3, in ♂ moderately or rather strongly ciliated, basal joint moderately elongate, with pecten. Labial palpi long, recurved, second joint not or hardly reaching base of antennae, thickened with appressed scales, terminal joint as long as second, scaled, acute, Maxillary palpi very short, filiform, appressed to tongue. Posterior tibiae clothed with hairs above. Fore-wings with 1b furcate, 2 from towards angle, 7 and 8 stalked, 7 to termen, 11 from middle. Hind-wings 1, trapezoidal-ovate, cilia $\frac{1}{2}$ - $\frac{3}{4}$; 3 and 4 connate, 5-7 nearly parallel.

Represented by one species only, which has been artificially introduced from Australia in recent times.

PAROCYSTOLA ACROXANTHA.

(*Ocystola acroxantha*, Meyr., Proc. Linn. Soc. N.S.W., 1884, 1066.)

(Plate XXX., fig. 27 ♀.)

This common Australian species was first observed in New Zealand in the year 1886. Since that time it has occasionally occurred in the immediate vicinity of Wellington.

The expansion of the wings varies from $\frac{1}{2}$ to slightly over $\frac{1}{2}$ inch. The fore-wings, which have the apex acute and the termen curved, are bright reddish-brown clouded with darker brown near the termen; there are three black discal dots in the middle of the wing and the cilia below the apex are very vivid orange yellow. The hind-wings are grey.

The perfect insect appears from October till January, and frequents gardens and other cultivated places. Mr. Meyrick informs me that the larva feeds only on the *Eucalyptus*, and hence there is no doubt that this insect has been accidentally introduced with young *Eucalyptus* plants and subsequently established itself. It has also become established in the south-west of England.

Genus 19.—EUTHICTIS, Meyr.

Antennae without basal pecten; palpi with second joint smooth, scaled, not exceeding base of antennae, terminal joint shorter than second. Vein 7 of fore-wings to termen.

Represented by one species in New Zealand and three in Australia and Tasmania.

EUTHICTIS CHLORATMA.

(*Trachypepla chloratma*, Meyr., Trans. N.Z. Inst., xlviii., 416.)

(Plate XLVI., fig. 3 ♀.)

This species was discovered by Mr. Philpott at Table Hill, Stewart Island. It has also occurred at Invercargill, Knife and Steel (Fiord County), and Lake Manapouri.

The expansion of the wings is barely $\frac{3}{4}$ inch. The fore-wings are elongate-oval with the termen very oblique, *bright yellow with brownish-black markings; there is a broad streak along the costa from the base to nearly $\frac{1}{2}$; a cloudy band along the dorsum almost reaching the tornus; a curved band cutting off the apical area which is thinly and irregularly sprinkled with blackish scales; there is another irregular faint curved marking connecting the costal apical and dorsal bands.* The hind-wings are pale grey.

Apparently variable in the extent of the dark markings.

The perfect insect appears in December, and frequents lowland forests.

Genus 20.—OXYTHECTA, Meyr.

Basal joint of antennae with pecten. Second joint of labial palpi expanded, with scales beneath on posterior half and rough towards apex, terminal joint as long as second. Hind-wings elongate-ovate or ovate-lanceolate.

An Australian genus of limited extent, represented in New Zealand by one species only.

OXYTHECTA AUSTRINA.

(*Saropla austrina*, Meyr., Trans. N.Z. Inst., xli., 107.)

(Plate XXXII., fig. 14 ♂.)

This rather dull-looking insect has occurred on Mount Ruapehu at about 4,000 feet, and on Ben Lomond, near Queenstown, Lake Wakatipu.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are moderately broad with the costa slightly arched and the termen very oblique; grey with faint bronzy reflections; there is a longitudinal blackish streak from the base to about $\frac{1}{2}$; a large discal spot at about $\frac{1}{3}$; two cloudy longitudinal whitish streaks, one from the base to the tornus, the other from considerably before the discal dot to the termen below the apex. The hind-wings and cilia are pale bronzy-grey.

The perfect insect appears in December and January, and is found in open country at altitudes of from 2,000 to 4,000 feet above the sea-level.

Described and figured from a specimen kindly given to me by Mr. Philpott.

Genus 21.—PHILOBOTA, Meyr.

Basal joint of antennae with pecten. Second joint of labial palpi with appressed scales, somewhat loose towards apex beneath, terminal joint shorter than second. Hind-wings elongate-ovate.

A very large Australian genus, already including about 250 species. There are two species in New Zealand.

PHILOBOTA ALETIS.

(*Philobota aletis*, Meyr., Trans. Ent. Soc. Lond., 1905, 235.)

One specimen of this very obscure species was discovered by Mr. Meyrick at Arthur's Pass at an elevation of 3,000 feet above the sea-level.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch. Head and thorax light fuscous sprinkled with whitish-ochreous. Palpi whitish-ochreous, a sub-apical ring of second joint, and terminal joint except apex somewhat infuscated. Antennae greyish-ochreous, ciliations 3. Abdomen fuscous. Fore-wings elongate, moderate, costa gently arched, apex round-pointed, termen somewhat rounded, rather strongly oblique; greyish-ochreous irrorated with fuscous; some dark fuscous scales towards base of costa; first discal and plical stigmata very obscure darker, plical rather obliquely beyond first discal; second discal distinct, dark fuscous, with some whitish scales beneath it: cilia greyish-ochreous mixed with fuscous. Hind-wings rather dark fuscous, lighter anteriorly; cilia light fuscous, with darker sub-basal shade, tips whitish.

It is an insect of the most obscure appearance, probably allied to the other New Zealand species of the genus, *P. amenena*, but differing obviously in the very much smaller size and dark hind-wings. These two outliers of a characteristic Australian genus are probably amongst the few indications of an immigration by way of Tasmania.

The perfect insect appears in January.

I am unacquainted with this species. The above is a copy of the original description.

PHILOBOTA AMENENA.

(*Philobota amenena*, Meyr., Trans. N.Z. Inst., xx., 78.)

(Plate LII., fig. 21 ♀.)

This very pale-looking species was discovered on Arthur's Pass at an altitude of about 3,000 feet.

The expansion of the wings is thirteen-sixteenths of an inch. *The fore-wings are very pale ochreous, with pale brown markings; two minute dots in disc at $\frac{1}{4}$, one on fold; a round dot in disc at $\frac{1}{2}$; a conspicuous transverse line from costa near apex to tornus, with two extremely strong angulations on costal half, the rest of the line being broken into a series of dots.* The hind-wings and cilia are pale ochreous.

The perfect insect appears in January.

GROUP D. DEPRESSARIADI.

Antennae in ♂ simple or shortly and irregularly ciliated.

Genus 22.—NYMPHOSTOLA, Meyr.

Basal joint of antennae without pecten. Second joint of labial palpi with short triangular tuft of scales at apex beneath. Fore-wings with 7 to apex. Hind-wings ovate, 5 bent and approximated to 4 at base. (Plate G., fig. 40, Head of *Nymphostola galactina*.)

This interesting endemic genus is represented by a single species only.

NYMPHOSTOLA GALACTINA.

(*Cryptolechia galactina*, Feld., Reis. Nov. Pl. cxl., 34; *Nymphostola galactina*, Meyr., Proc. Linn. Soc. N.S.W., 1882, 492; Trans. N.Z. Inst., xvi., 6.)

(Plate XXV., fig. 20 ♂; Frontispiece, fig. 29 egg.)

This delicate and very beautiful species has occurred at many localities in both islands, but does not appear to

be common anywhere. It is very rare in the extreme south.

The expansion of the wings is about 1 inch. The fore-wings are broad with the costa very strongly arched, the termen straight and the tornus rounded; white, in living specimens more or less tinged with very pale green; all the veins are marked at regular intervals with minute grey dots and there is a more conspicuous grey dot in the disc beyond the middle. The hind-wings are white.

The egg is very thin wafer-like oval with a slight projection; the edge is semitransparent, the middle very pale yellowish-green and the whole surface covered with slight irregular hexagonal depressions. The young larva is about one thirty-second of an inch long; the head and second segment are large horny black and shining; the rest of the body brownish-ochreous and the whole larva covered with very long hairs. The foodplants are ramarama (*Myrtus bullata*, *Drimys colorata*, and tarata (*Pittosporum eugenioides*)).

The pupa, according to Messrs. Hanify and Myers, is suspended by the tail fully exposed, attached to the midrib of a leaf, almost at right angles from the surface of the leaf, after the manner of the pupa of a butterfly or plume moth.

The perfect insect appears in December, January and February, and frequents forest. It is sluggish in its habits and slow to take wing, and this may lead to its being often overlooked. Although widely distributed, it is never abundant and, as a rule, only single specimens are met with. This lovely insect probably imitates the delicate white petals of the flowers of the ramarama, which blooms during the early part of February.

Genus 23.—PROTEODES, Meyr.

Basal joint of antennae without pecten. Second joint of labial palpi with appressed scales, somewhat rough beneath. Fore-wings with 7 to apex. Hind-wings ovate, 5 bent and approximated to 4 at base. (Plate G., fig. 29, head of *Proteodes carnifex*.)

An endemic genus represented by four species.

PROTEODES CARNIFEX.

(*Cryptolechia carnifex*, Butl., Proc. Zool. Soc. Lond., 1877, 406; *Proteodes carnifex*, Meyr., Proc. Linn. Soc. N.S.W., 1882, 493; Trans. N.Z. Inst., xvi. 7; *Cryptolechia rufosparsa*, Butl., l.c. 406.)

(Plate XXXII., figs. 23, 24, 25 varieties.)

This very pretty and variable species has occurred at Gollan's Valley, near Wellington, in the North Island, and on the Tableland of Mount Arthur, at Christchurch, Mount Hutt, Castle Hill, Arthur's Pass and Lake Wakatipu, in the South Island.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are broad with the costa strongly arched and the termen almost straight, pale brownish-ochreous; the anterior legs and the extreme costal edge are usually bright red, the costal edging being broken at $\frac{1}{3}$ and $\frac{2}{3}$; there is often a dusky grey shading along the costa, across the middle of the cell and on the termen the veins are usually dotted with blackish-grey. The hind-wings are white shaded with grey at the apex.

There is much variation in the colour of the fore-wings which are sometimes clouded with pale greyish-brown, sometimes uniform bright reddish-brown, or orange-brown, without markings, and sometimes clear yellow. The size and outline are, however, very constant and characteristic so that little difficulty is usually experienced in recognising the insect.

According to Mr. Meyrick the larva has sixteen legs, is rather stout, cylindrical, tapering behind; pale whitish-green or yellowish-green, generally more greyish-green on the sides; the dorsal line is broad, irregular, dark brownish-purple, sap-green or yellowish-green mixed with reddish-ochreous and bisected by a slender, interrupted, whitish line; the lateral line is sap-green or obsolete; the sub-spiracular line is slender, interrupted, dark brownish purple or faintly pinkish; the spots are small, shining, dark brown; the head is ochreous-brown or yellowish-green; the second segment is greener than the body, or blackish marbled with pale ochreous, the larva generally being remarkably variable. It feeds on the mountain beech (*Nothofagus Solandri*) in January, making a slight web amongst the leaves from which it is very readily dislodged.

The pupa, which is short, stout, and pale green, irregularly shaded with brown, is enclosed in a slight cocoon amongst the dead beech leaves.

The perfect insect appears from January till April. It frequents beech forests, usually at elevations of from 1,000 to 3,500 feet above the sea-level, where it is often extremely abundant. In its shape, size and colouring it resembles the faded or fallen leaves of the beech, the yellow and reddish-brown varieties, which are mostly females, approximating very closely in this respect. This interesting protective resemblance, which is shared by most of the beech-feeding insects, was first observed by J. D. Enys over 40 years ago.

PROTEODES MELOGRAPHA.

(*Proteodes melographa*, Meyr., Trans. N.Z. Inst., lvii., 700.)

(Plate LII., fig. 20 ♂.)

This very distinct species was discovered by Selwyn Woodward, on Mount Arthur, at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are broadly oblong, with the costa strongly arched at the base; pale cream colour with numerous blackish-grey strigulae; basal area irregularly sprinkled with blackish and dull reddish scales; a wavy transverse black line from $\frac{1}{4}$ of costa to about $\frac{1}{4}$ of dorsum; a conspicuous tuft of reddish scales in disc beyond this; a cloudy patch of reddish and blackish scales on costa at $\frac{1}{2}$; a large very diffused patch of blackish-grey scales on costa before apex and a similar smaller patch on tornus; a chain of black dots along sub-costal vein; several indistinct transverse series of faint reddish-ochreous spots on outer third of wing; a terminal series of blackish dots; cilia grey indistinctly barred with darker. The hind-wings and cilia are very pale creamy-grey with dark discal dot and terminal marks.

The perfect insect appears in January. It may be looked for on mountains near the upper limit of forest growth.

PROTEODES CLARKEI.

(Proteodes clarkei, Philp. Trans. N.Z. Inst., lvi., 396.)

(Plate LII., fig. 27 ♀.)

This very bright-looking species was discovered by Mr. S. Lindsay, on the Hunter Mountains, at an altitude of 4,000 feet above the sea-level.

The expansion of the wings is slightly over $\frac{7}{8}$ inch. The fore-wings, which have the apex rather prominent and the termen oblique, are bright ochreous-yellow, with broad bright orange-brown markings; a very broad, sharply defined longitudinal band along costa and a broad shading along termen and dorsum; there is a minute black discal dot; the cilia are pinkish-brown. The hind-wings are very pale golden-ochreous; the cilia are pale pink.

The perfect insect appears in January.

Described and figured from a specimen submitted by Mr. Philpott.

PROTEODES PROFUNDA.

(Proteodes profunda, Meyr., Trans. Ent. Soc. Lond., 1905, 236.)

(Plate XXV., fig. 42 ♀.)

This rather dull-coloured species was discovered on the lower slopes of Mount Holdsworth, Tatarua Range. It has also been taken at Raurimu, Days Bay Wellington, Mount Arthur, Otira, Invercargill and on Longwood Range and The Hump, Southland.

The expansion of the wings is about $\frac{7}{8}$ inch. The fore-wings are rather broad, oblong, sharply attenuated at the base, with the apex and tornus very slightly rounded; brownish-ochreous more or less speckled and mottled with dark brown; there is a fine curved black streak from the costa at the base extending for a short distance along the dorsum; a mottled irregular patch of rich brown from the base to $\frac{1}{2}$, not reaching the costa; two indistinct patches of dark brown on the costa at about $\frac{1}{4}$ and $\frac{3}{4}$; a much larger patch just before the apex and another patch on the termen below the apex; all the principal veins are marked with rather large brownish-black dots. The hind-wings are pale ochreous-brown, faintly clouded with darker brown near the apex and tornus.

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The perfect insect appears from November till February. It usually frequents beech forests at elevations of about 2,000 feet above the sea-level. It is rare and, owing to its close resemblance to a dead beech leaf, extremely inconspicuous. Its superficial resemblance to a Tortrix is very remarkable. Mr. Philpott states that, in the extreme south, mountain specimens are considerably larger than the lowland forms.

Genus 24.—LATHICROSSA, Meyr.

Basal joint of antennae without pecten. Second joint of labial palpi thickened with appressed scales. Thorax crested. Fore-wings with 7 to costa. Hind-wings trapezoidal-ovate. (Plate G., fig. 28, head of *Lathicrossa leucocentra*.)

An endemic genus represented by two species.

LATHICROSSA LEUCOCENTRA.

(Lathicrossa leucocentra, Meyr., Trans. N.Z. Inst., xvi., 26.)

(Plate XXXII., fig. 5 ♀.)

This active little sun-loving species has occurred at Whangarei, Auckland, Kaitoke, Wellington, Dunedin, Lake

Wakatipu, and Stewart Island. It is probably generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are dull black with bronzy reflections and dull white markings; there are three conspicuous white dots forming a triangle near the middle of the wing; a small dull white patch on the costa at about $\frac{1}{2}$; another similar patch at $\frac{3}{4}$ connected with a winding transverse line which reaches the tornus; there is a number of dull white scales scattered over the wing and a marginal series of small dull white dots. The hind-wings are dull black paler towards the base. The legs are black with dull white rings.

The perfect insect appears from the beginning of November until the end of January. It frequents forest, often resting on the upper surface of leaves in brilliant sunshine. Whilst thus engaged the antennae, fore- and intermediate legs are extended, the wings being loosely closed over the back and slightly inclined upwards. This species is active on the wing and, owing to its black colour, extremely difficult to follow when flying. It is rather rare and only one, or perhaps two specimens are usually observed in a season. The white discal dots on the fore-wings form a good distinctive character and serve to distinguish it from several other black species which are superficially very similar.

LATHICROSSA PROPHETICA.

(Lathicrossa prophetica Meyr., Trans. N.Z. Inst., lviii., 701.)

(Plate LII., fig. 8 ♂.)

This very distinct species was discovered by Selwyn Woodward, on Mount Arthur, at an elevation of about 3,500 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are dull rose-colour, heavily streaked with black scales, especially on the sub-terminal, tornal and costal areas; there are two small clear patches of rose-colour on the costa at about $\frac{1}{2}$ and $\frac{3}{4}$; a black spot near base; two in disc at $\frac{1}{2}$ and $\frac{3}{4}$ and a fourth on fold near middle; the cilia are black, mixed with rose-colour. The hind-wings and cilia are deep brownish-black.

The perfect insect appears in January and frequents sub-alpine forest.

Genus 25.—CRYPTOLECHIA, Zell.

Basal joint of antennae without pecten. Second joint of labial palpi with appressed scales. Thorax smooth. Fore-wings with 7 to costa or apex. Hind-wings trapezoidal-ovate. (Plate G., figs. 34, 35, 36, neuration and head of *Cryptolechia biochroa*.)

A considerable genus of wide distribution containing six New Zealand species.

CRYPTOLECHIA CALLIXYLA.

(Leptosaces callixyla Meyr., Trans. N.Z. Inst., xx., 78.)

Two specimens of this species were taken by Mr. Meyrick at Whangarei and Nelson respectively.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dark fuscous strewn with yellow-ochreous scales, in female suffused with yellow-ochreous towards dorsum; a longitudinal yellow-ochreous streak in disc from $\frac{1}{2}$ to $\frac{3}{4}$ in female extended to base; a cloudy dark fuscous dot on this streak at $\frac{1}{2}$, and several beyond middle, and a third on fold obliquely beyond first; a yellow-ochreous transverse line, in male ill-defined from $\frac{1}{2}$ of costa

to tornus, sharply angulated in middle indented beneath costa; an irregular yellow-ochreous terminal line. Hind-wings and cilia grey.

The perfect insect appears in December and January, and frequents forest.

I am unacquainted with this species. The above is abridged from the original description.

CRYPTOLECHIA SEMNODES.

(*Cryptolechia semnodes*, Meyr., Trans. N.Z. Inst., xliii., 75.)

(Plate XXXII., fig. 22.)

This black-looking, stoutly-built little species is found on the Tableland of Mount Arthur, at an elevation of about 4,200 feet above the sea-level.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The antennae are stout, very slightly thickened near the middle. The fore-wings are oblong with the costa slightly arched and the tornus rounded, vein 7 running into the termen; *very deep brownish-black*; there are two very obscure whitish-grey patches on the costa, one near the middle and one before the apex, and an obscure black discal dot at $\frac{3}{4}$. *The hind-wings are brownish-black, slightly paler towards the base. The abdomen has the under-side of the last four segments clouded with brassy-yellow.*

The perfect insect appears in February, and flies in the hottest sunshine. It is evidently a very local insect.

CRYPTOLECHIA APOCRYPTA.

(*Phaeosaces apocrypta*, Meyr., Trans. N.Z. Inst., xviii. 172.)

(Plate XXV., fig. 21.)

This dull-looking insect has occurred at Christchurch, Dunedin, Central Otago, Lake Wakatipu, Invercargill and Stewart Island.

The expansion of the wings is slightly under 1 inch. *The fore-wings are oblong, somewhat narrower near the base, with the tornus rounded, dull brownish-ochreous finely speckled with blackish-brown; there is a small round blackish dot in the disc at about $\frac{1}{3}$; a second much less distinct spot just beneath it on the fold and a third beyond the middle; there is a cloudy curved transverse line from $\frac{1}{4}$ of the costa to the tornus and series of elongate marks on the termen. The hind-wings are dull greyish-ochreous, finely speckled with darker grey.*

There is slight variation in the shape of the wings, which are usually more oblong in the male than in the female. In some specimens the general colouring is slightly brighter, and in others the discal dots are obsolete.

The perfect insect appears in December and January. Mr. Philpott informs me that it is very common amongst forest. When disturbed it does not fly but falls to the ground where it darts rapidly to and fro by means of its legs until it secretes itself in a crevice amongst the fallen leaves and twigs.

CRYPTOLECHIA LIOCHROA.

(*Phaeosaces liochroa*, Meyr., Trans. N.Z. Inst., xxiii., 98.)

(Plate XXV., fig. 22 ♀, 23 ♂.)

This pretty species, which is the most brightly-coloured of the genus, has occurred at Waimarino, Wellington, Nelson, Christchurch, Castle Hill, Otira River, Lake Wakatipu and Invercargill.

The expansion of the wings varies from slightly under, to slightly over 1 inch. *The fore-wings are elongate-oblong, narrower at the base, pale brownish-ochreous in the male and bright reddish-brown in the female; the extreme costal edge in the male is bright orange-brown; there is a blackish-brown dot in the disc at about two-fifths, another beneath it on the fold and a third in the disc at about $\frac{1}{3}$; there is a strongly curved series of minute black dots from about $\frac{1}{4}$ of the costa to $\frac{1}{4}$ of the dorsum, the dots at each end of the series being indistinct; a chain of elongate dots is also situated on the termen; the cilia are dull brown in the male, bright reddish-brown in the female. The hind-wings are pale yellowish-ochreous in both sexes, densely speckled with dark grey towards the body.*

There is slight variation in size, in the brilliancy of the reddish-brown colouring of the fore-wings in the female, and in the intensity of the blackish markings, which are sometimes more or less obsolete in both sexes. Some female specimens also have the fore-wings more or less speckled with dull blackish-brown.

The perfect insect appears from the middle of November until the end of January, and frequents forests, chiefly on hills at about 1,000 feet above the sea-level. It is rare and uncertain in its appearance and, as a rule, only single specimens are met with. It is sluggish in its habits, and when disturbed generally falls to the ground with closed wings where it remains motionless for a considerable time. In this position it closely resembles a faded leaf, and the protective value of the colouring of both sexes is then evident.

CRYPTOLECHIA RHODOBAPTA.

(*Cryptolechia rhodobapta*, Meyr., Trans. N.Z. Inst., liv., 166.)

(Plate XLIX., fig. 25 ♂.)

A single specimen of this species has occurred at Takapuna, near Auckland.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are very broad with the costa strongly arched, *deep red*, very slightly tinged with purple; there is a small blackish discal dot; a minute dot on the fold; two minute dots beyond this and a chain of elongate blackish marks above the tornus. The hind-wings are bright ochreous with pink cilia.

In general appearance this species somewhat recalls the female of *Cryptolechia liochroa*, but is smaller and has much broader wings.

The perfect insect appears in January.

CRYPTOLECHIA COMPSOTYPA.

(*Phaeosaces compsotypa*, Meyr., Trans. N.Z. Inst. xviii., 172.)

(Plate XXXII., fig. 1 ♀.)

This obscurely-marked species has occurred at Whangarei, Hamilton, Mount Holdsworth (Taranaki Range), Wellington, and Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are moderately broad, oblong, *pale brownish-grey with black markings*; there is a small patch on the costa at the base; a larger patch at $\frac{1}{4}$; a large, irregular patch on the dorsum at $\frac{1}{2}$; a very imperfect zigzag line extends from this patch to the costa at about $\frac{1}{3}$; there is an indistinct discal dot beyond the middle and an irregular sprinkling of black scales; a rather conspicuous series of black dashes between the veins and an interrupted terminal line. The hind-wings are very pale grey, sprinkled with darker grey towards the apex and termen.

Some specimens are more distinctly marked than others and the depth of the ground colour of the fore-wings is also subject to slight variation.

The perfect insect appears from January till March. It frequents forest from the sea-level to elevations of about 3,000 feet, but is not a common species.

Genus 26.—SYMMOCA, Hübner.

Basal joint of antennae without pecten. Second joint of labial palpi with appressed scales. Thorax smooth. Fore-wings with 7 to costa. Hind-wings elongate-ovate, 6 and 7 stalked.

A genus of some extent, chiefly European. The following species must be an accidental introduction.

SYMMOCA QUADRIPUNCTA.

(*Symmoca quadripuncta*, Haw., Lep. Brit., 557; Meyrick Handbook British Lepidoptera, 611.)

(Plate XXXII, fig. 12 ♂.)

This very distinctly-marked British insect was discovered at Nelson, by Mr. R. M. Sunley, in 1908.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which have the costa straight and the apex somewhat acute, are pale yellow; there are four irregular broad blackish-brown transverse bands and two discal dots. The hind-wings are very pale greyish-white.

The perfect insect appears in February. Mr. Meyrick gives its distribution as South England to Suffolk and Gloucester, East Ireland; Central and South Europe and West Central Asia to North Persia. It has probably been accidentally introduced into New Zealand from Britain. It is attached to the neighbourhood of houses but its larval habits are not known.

Genus 27.—EUTORNA, Meyr.

Basal joint of antennae without pecten. Second joint of labial palpi thickened with dense appressed scales. Thorax smooth. Fore-wings with 6 to apex. Hind-wings elongate-ovate; 3 and 4 separate, 5 bent. (Plate H., figs. 4, 5, 6, neuration and head of *Eutorna caryochroa*.)

Contains about a dozen Australian species and one Indian. It is represented in New Zealand by two species.

EUTORNA CARYOCHROA.

(*Eutorna caryochroa* Meyr., Trans. N.Z. Inst., xxi., 158.)

(Plate XXXII, fig. 9 ♂.)

This very richly-marked little insect has occurred at Waimarino, Wellington, Castle Hill, Otira River, Dunedin, Lake Wakatipu and Invercargill. It is a rare species in the Wellington district, although stated to be rather common elsewhere.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings have the costa strongly arched at the base and the apex and tornus rounded; deep chocolate brown; there is a very broad, doubly curved cloudy yellow discal streak from the base almost to the termen; a narrow black streak along the fold to about $\frac{1}{2}$; a large, somewhat triangular, patch of purplish-grey and white scales on the costa near the middle; a small clear white mark on the costa before the apex; a black centred white discal spot at $\frac{2}{3}$; a sub-terminal cloudy white band and a terminal series of black spots. The hind-wings are dark greyish-brown, darker towards the apex.

The perfect insect appears in December and January, frequenting forest and scrub. It flies freely in the daytime and is fond of basking on leaves in the hottest sunshine. It seems to be attached to the totara (*Podocarpus totara*.)

EUTORNA SYMMORPHA.

(*Eutorna symmorpha*, Meyr., Trans. N.Z. Inst., xxi. 158.)

(Plate XXXII, fig. 8 ♂.)

Although rare in the neighbourhood of Wellington, this rather inconspicuous species appears to be generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are narrow with the apex and tornus rounded; light brown, somewhat paler on the veins and in the disc; there is a darker brown streak on the fold near the base, and a less distinct streak from below the costa at $\frac{1}{2}$ to the apex; two unequal black dots are situated in the disc at about $\frac{2}{3}$ and a marginal series of minute black marks near the apex. The hind-wings are pale grey.

The perfect insect appears from November till April, and is found amongst rough herbage and on the edges of forest.

Sub-family 4.—XYLORYCTIDES.

Head with loosely appressed scales. Labial palpi long, recurved, acute. Maxillary palpi very short, appressed. Fore-wings with 2 remote from angle, 7 and 8 stalked or separate. Hind-wings broadly trapezoidal, apex obtuse, termen faintly sinuate; 3 and 4 connate, 5 rather approximated, 6 and 7 approximated or stalked. (Plate G., figs. 37, 38, 39.)

A large sub-family, chiefly found in the Southern Hemisphere and Indian regions; most numerous in South America. It is represented in New Zealand by two genera.

1. SCIEROPEPLA.

2. AGRIOPHARA.

Genus 1.—SCIEROPEPLA, Meyr.

Fore-wings with veins 7 and 8 stalked, 7 to costa.

A small Australian genus, of which one species also occurs in New Zealand.

SCIEROPEPLA TYPHICOLA.

(*Scieropepla typhicola*, Meyr., Trans. N.Z. Inst., xviii., 165.)

(Plate XXXII, fig. 15 ♀.)

This species has occurred at Christchurch.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are rather elongate with the costa arched and the apex acutely pointed; pale ochreous with the veins clearly marked by scattered blackish scales; similar scales are also thinly strewn in the disc and on the dorsum. The hind-wings, which have the apex rather acute are dull white, with the elia whitish-ochreous.

The larva has 16 legs, is stout, cylindrical; whitish, sometimes slightly tinged with pale flesh colour; the dorsal line is slender, dark flesh colour; the subdorsal and spiracular lines are broader, indistinct, flesh colour; the head is pale amber with the mouth brown; the second segment with a faint pale amber shield, black margined on the sides; the anal segment is speckled with black. It feeds in the seed-heads of the bullrush (*Typha angustifolia*) burrowing amongst the seeds, and causing the down to hang out in large loose masses; sometimes also boring

down the stems and eating the pith, and making many small holes in the sides; found throughout June.

The perfect insect appears in June, July and August, but is rarely seen at large, although bred freely from the seed-heads. This species also occurs in New South Wales and must be regarded as an immigrant from Australia. (Meyrick).

Described and figured from a specimen in the Fereday collection.

Genus 2.—AGRIOPHARA, Ros.

Fore-wings with veins 7 and 8 separate, 7 to apex. (Plate G., figs. 37, 38, 39 neuration and head of *Agriophara coricopa*.)

This genus, which is represented in New Zealand by one species only, includes a moderate number of Australian and Indian species.

AGRIOPHARA CORICOPA.

(*Hypeuryntis coricopa*, Meyr., Trans. Ent. Soc. Lond., 1897, 389.)

(Plate XXV., figs. 11, 12 varieties; Plate III., fig. 15 larva.)

This rather large species has occurred fairly commonly in the Wellington District and has also been found at Otago and Dunedin.

The expansion of the wings is about 1 inch. The fore-wings have the costa almost straight and the termen slightly oblique; *pale greyish-ochreous, very thinly sprinkled with a few brown scales*; there is an indistinct oblique series of blackish dots from the costa at about $\frac{1}{2}$; several obscure costal dots beyond this; *a conspicuous discal spot beyond the middle* and a curved series of sub-terminal dots. The hind-wings are rather broad, almost white. The antennae in the male are furnished with very long cilia.

A variety occurs in which the fore-wings are very pale greenish-ochreous *with a wide brown streak from the base to the apex*, broadest in the middle, the other markings being similar to those in the type.

The larva is about $\frac{1}{2}$ inch in length, rather stout, tapering at each end. The head is brown with three broad darker brown bands; the second segment is pale brown and horny; the rest of the body creamy white with three dark brown dorsal stripes; each segment has eight dark brownish or black warts generally surmounted by a fine yellowish bristle. It feeds in November and December on the flowers and green upper surface of the leaves of *Olearia Cunninghamii*, also between joined leaves of the ake ake (*Olearia Forsteri*) and on the flowers and leaves of *Olearia Solandri*.

The pupa is very stout, about five-sixteenths of an inch long, reddish-brown, or dark mahogany-brown. It is enclosed in a loose silken cocoon amongst the old flowers, or half eaten leaves.

The perfect insect frequents scrub. It has been taken in August, September and October, but is usually found in January, although stragglers occasionally occur in the late autumn, or early winter. It is therefore probable that the species hibernates in the imago state.

Sub-family 5.—COPROMORPHIDÆ.

Labial palpi long or very long, thickened with scales, terminal joint more or less obtuse. Fore-wings with tufts of scales on surface, vein 7 separate, to termen. Hind-wings veins 3 and 4 connate, 5-7 nearly parallel. (Plate F., 19-21 and Plate A., figs. 17-19.)

This small sub-family, whose position is somewhat doubtful, is represented in New Zealand by two genera.

1. PHYCOMORPHA.

2. ISONOMEUTIS.

Genus 1.—PHYCOMORPHA, Meyr.

Head with loosely appressed scales; tongue short; ocelli absent. Antennae $\frac{1}{2}$, in δ with strong flat dentations, basal joint moderate without pecten. Labial palpi long, curved, obliquely ascending, second joint much thickened with dense scales, roughly expanded on posterior half above and slightly rough beneath, terminal $\frac{1}{4}$ of second, cylindrical, hardly pointed. Maxillary palpi obsolete. Thorax with posterior crest. Posterior tibiae with appressed scales or slightly roughened above. Fore-wings with tufts of scales on surface; 1b furcate, 2 from towards angle, 3-5 approximated, 7 to termen, 8 and 9 stalked, 11 from middle. Hind-wings over 1, subovate, cilia $\frac{1}{2}$; lower margin of cell with basal pecten of hairs, 3 and 4 connate or short-stalked, 5 somewhat approximated towards base, 6 and 7 parallel. (Plate F., figs. 19, 20, 21 neuration head and antenna of *Phycomorpha metachrysa* δ .)

One species occurs in New Zealand and another in Australia.

PHYCOMORPHA METACHRYSA.

(*Phycomorpha metachrysa*, Meyr., Trans. N.Z. Inst., xlv., 106.)

(Plate XXVI., fig. 43 δ .)

This very remarkable and interesting species was discovered by Mr. G. W. Howes at Dunedin. It has also occurred at Gollan's Valley, near Wellington, and at the head of Lake Wakatipu.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are rather dilated towards termen; *purplish-brown, sprinkled with blackish, tips of scales golden-metallic*; there is a series of short black marks on the costa near the base; *a very large, sometimes conspicuous, irregular blotch on the outer portion of the disc, the lower part pale green, the upper pale brown*; around this blotch there are often several very irregular black marks. The hind-wings are grey.

There is considerable variation. In some specimens the fore-wings are more or less suffused with dull olive green; in others there is *a very large creamy-white blotch on the dorsum reaching more than half-way across the wing*; in many the outer discal blotch is not nearly so distinct as it is indicated in the figure here given. The tufts of scales on the fore-wings and the peculiar structure of the antennae will, however, usually enable the species to be recognised without difficulty.

The perfect insect appears from October till April, and may be looked for in forest, but is by no means common.

Described and figured from a specimen in Mr. Philpott's collection, prior to the discovery of the insect near Wellington.

Genus 2.—ISONOMEUTIS, Meyr.

Forehead with projecting scales. Antennae in male filiform, shortly ciliated (1). Palpi very long, straight, porrected, with rough projecting scales above and beneath, somewhat attenuated, terminal joint concealed. Thorax smooth. Posterior tibiae smooth-scaled. Fore-wings with veins 3 and 4 approximated at base, 7 to termen, surface with small tufts of scales. Hind-wings markedly narrower than fore-wings, rounded; veins 3 and 4 short-stalked, 5, 6, 7 tolerably parallel, lower median naked. (Plate A., figs. 17, 18, 19 neurulation and head of *Isonomeutis amauropa*.)

A singular endemic genus of very doubtful affinities, represented by two species only, both confined to the North Island.

ISONOMEUTIS AMAUROPA.

(*Isonomeutis amauropa*, Meyr., Trans. N.Z. Inst., xx., 75.)

(Plate XLV., fig. 22 ♂; fig. 23 ♀; Plate III., fig. 8 larva.)

This interesting, though rather dull-coloured species, has occurred at Kaeo, Whangarei, Waimarino, and Wellington in the North Island. At present it has not been taken in the South Island.

The expansion of the wings is $\frac{5}{8}$ inch. All the wings are pale yellowish-bronze very heavily speckled with dark blackish-brown scales in the male but with only a few dark scales in the female. The fore-wings are rather elongate with the apex rounded and the termen oblique; there is an irregular broken black stripe at $\frac{1}{2}$; a conspicuous elongate discal dot; a more or less conspicuous spot near the middle of the dorsum; a broad dark transverse band at $\frac{3}{4}$ bowed towards the termen; three or four indistinct blackish dots on the costa before the apex; an obscure sub-terminal shade and series of terminal dots. The hind-wings, which are rather small with the apex rounded, have a conspicuous black discal dot; a faint irregular ring of blackish-brown enclosing a paler area near the tornus and a dark terminal shading towards the apex. The markings are very similar in both sexes but owing to the much paler ground colouring of the female they are plainer in that sex than in the male.

The larva lives under the scaly bark of the rimu tree (*Dacrydium cupressinum*) feeding on the soft, juicy inner bark and sap and forming galleries of frass and silk.

When full-grown it is about $\frac{1}{4}$ inch long, moderately stout and rather flattened. The head is brown highly polished; the second segment has a large dorsal and two small shining brown lateral plates; segments 3 and 4 each have two narrow oblique horny plates; the rest of the body is soft, bright pinkish-brown above, much paler beneath; there are three conspicuous warts on each segment except the last and two obscure warts below the lateral ridge; the last segment is dark yellowish-brown with numerous warts. The whole larva is clothed with a few scattered black bristles, which are more numerous at each extremity.

The pupa is enclosed in an oval cocoon constructed of tough silk covered on the outside with frass and fragments of bark. It is securely hidden in a crevice under the bark.

The perfect insect appears from November till February, and frequents forest. It often rests on the upper surfaces of leaves basking in the sunshine and at such times is very agile. It is not a common species.

ISONOMEUTIS RESTINCTA.

(*Isonomeutis restincta*, Meyr., Trans. N.Z. Inst., liv., 166.)

(Plate XLIX., fig. 13 ♀.)

A single specimen of this interesting species has occurred at Kaeo, north of Auckland.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are elongate-oval with the termen very oblique, pale brownish-ochreous with very irregular blackish-brown markings; there is an indefinite patch at the base; two or three ill-defined blotches beyond this; a large irregular patch in the disc; several ill-defined bars on the costa; an obscure sub-terminal line and a series of terminal spots. The hind-wings are pale ochreous-brown, very thickly strewn with darker brown scales, with a darker discal spot and a series of much darker brown blotches and paler interspaces around the tornus. The head and thorax are pale brown; the abdomen is pale brown, ringed with bright brown.

The perfect insect appears in January.

Sub-family 6.—HELIODINIDÆ.

Head smooth. Basal joint of antennae without pecten. Labial palpi long, recurved, slender, acute. Maxillary palpi rudimentary or obsolete. Posterior legs raised from surface in repose, tarsi with whorls of bristles at apex of basal joints. Fore-wings with veins 7 and 8 separate or stalked. Hind-wings lanceolate, 2-5 remote. (Plate H., figs. 7-17.)

A considerable sub-family, chiefly tropical, represented in New Zealand by the five following genera:

- | | |
|-------------------|-----------------|
| 1. CALICOTIS. | 3. STATHMOPODA. |
| 2. VANICELA. | 4. PACHYRHABDA. |
| 5. THYLACOSCELES. | |

Genus 1.—CALICOTIS, Meyr.

Basal joint of antennae dilated to form an eyecap. Hind-wings with vein 4 absent.

Also occurs in Australia and the Seychelles (probably the Malayan region).

Represented in New Zealand by one species only.

CALICOTIS CRUCIFERA.

(*Calicotis crucifera*, Meyr., Trans. N.Z. Inst., xxi., 170.)

(Plate XXXII., fig. 13 ♀.)

This beautiful little insect seems to be very local, but when found is generally abundant. It has occurred at Taranaki, Palmerston North and Wellington.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are very narrow with the apex acute; snow white with black and orange-brown markings; there is a small patch of orange-brown on the costa at $\frac{1}{2}$; a much larger patch with a cloudy blackish centre on the dorsum at $\frac{1}{2}$; an oblique stripe of orange brown from the costa near the middle with a small blackish patch on the costa; a cloudy orange-brown mark at the apex with a black centre. The hind-wings are dull white.

According to Mr. Meyrick the larva has 16 legs, is moderately stout, cylindrical, active; whitish flesh-colour, or whitish; head pale whitish-brown. It feeds on *Platy-cerium grande* (a large epiphytic fern growing on tree trunks), burrowing amongst the ripe fructification beneath the fronds and forming galleries of loose refuse. It is found in March.

The perfect insect appears in February and March. It is common amongst its foodplant. It also occurs plentifully in the Botanical Gardens at Sydney, but has not been met with in the native forest in Australia, and it is therefore at least possible that it was introduced into Sydney

with ferns from New Zealand. The foodplant is, however, considered native in both countries.

Described and figured from a specimen in the Fereday collection.

Genus 2.—VANICELA, Walk.

Antennae in ♂ with long ciliations, basal joint dilated to form an eyecap. Anterior legs thickened with scales. Hind-wings with vein 4 present. (Plate H., fig. 14, 15, 16 neuration and head of *Vanicela disjunctella*; fig. 17 base of antenna showing eyecap.)

There is one species in New Zealand and three others in Eastern Australia.

VANICELA DISJUNCTELLA.

(*Vanicela disjunctella*, Walk., Cat. xxx., 1039; Meyr., Trans. N.Z. Inst. xxi., 166.)

(Plate XXXII., fig. 28 ♂.)

This very interesting and remarkable species appears to be fairly common and generally distributed throughout the North Island. Except in the Nelson district, it has not been observed in the South Island.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are very narrow, clear white slightly tinged with yellow; there is a broad bronzy black streak along the dorsum distinctly notched at about $\frac{1}{4}$ and $\frac{1}{2}$; a brown dot is situated beyond $\frac{1}{4}$ and several blackish scales at the apex. The hind-wings and all the cilia are grey. The head, palpi and antennae are white. The thorax is white with its posterior half bronzy-black. The heavily-scaled tibiae and tarsi of the fore-legs and the conspicuous eye-cap in the large basal joint of the antennae, already noticed under the generic description, are very remarkable and will at once distinguish this species from any other known in New Zealand.

The perfect insect appears from January till March, and frequents dense forests, where it is sometimes fairly common. It is especially characteristic of late summer and autumn, and may be found in the finest condition as late as the end of March. On several occasions I have taken worn specimens in the early spring, which seems to indicate that the insect passes the winter in the imago state. When at rest, this species places the fore-legs in front; the palpi forwards with the tips touching and together forming a semi-circle; the wings, intermediate- and hind-legs are closely appressed to the body, the tarsi being slightly turned outwards, and the antennae placed backwards along the sides.

Genus 3.—STATHMOPODA, Stt.

Antennae in ♂ with long ciliations. Hind-wings with vein 4 present. (Plate H., figs. 7, 8, 9, neuration and head of *Stathmopoda caminora*.)

A large genus, especially characteristic of the Indian and Australian regions. There are twelve species in New Zealand, some of which are, perhaps, of doubtful status. Of these three are confined to the North Island; two to the South Island, and seven common to both islands. The position assumed in repose by the hind-legs of the interesting little insects included in this genus is remarkable and is thus graphically described by Stainton, who, when he

founded the genus, regarded it as one of its most essential characters: "The hind-legs instead of being allowed to remain in what we should call their natural position, are doubled under and stuck out side-ways, projecting nearly at right angles on each side between the anterior and middle legs. The moth then walks on all-fours, with its gaily-coloured hind-legs stuck out side-ways for show; if it should feel that it wants a little extra leg-power to overcome some obstacle, down comes first one hind-leg and then the other, and it walks a few steps on all-sixes, but directly the obstacle is surmounted the hind-legs relapse into what is really their natural position."*

STATHMOPODA CAMINORA.

(*Stathmopoda caminora*, Meyr., Trans. N.Z. Inst., xxii., 219.)

(Plate XXXII., fig. 18 ♂.)

This very pretty and variable species has occurred at Auckland, Palmerston North, Wellington, Lyttelton and Invercargill. It is probably common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have a very broad leaden-grey costal streak, sometimes nearly covering the entire wing; the dorsal and terminal margins are pale yellow; there is a reddish - orange patch at the base; an oblique reddish - orange stripe on the dorsum at about $\frac{1}{4}$ and another at about $\frac{1}{2}$ sometimes continued as a faint cloudy shading as far as the apex. The antennae, head, thorax and legs are pale ochreous; there is often a pale reddish-orange shading on the top of the head and on the shoulders. The hind-wings and all the cilia are grey.

The perfect insect appears from October till December, frequenting forests, and, in the Wellington district, is often very abundant. It nearly always holds its hind-legs in the position described as characteristic of the genus.

STATHMOPODA DISTINCTA.

(*Stathmopoda distincta*, Philp., Trans. N.Z. Inst., liv., 152.)

(Plate XXXII., fig. 19 ♀.)

This very bright-looking little species was discovered by Mr. Philpott on the Dun Mountain near Nelson at an elevation of about 3,000 feet. It has also occurred at Otira.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are bright yellow; there is an inwardly-oblique bright brown bar from the costa at about $\frac{1}{4}$; from this point the costa is broadly margined with brown to about $\frac{3}{4}$, thence the whole wing is more or less clouded with bright brown. The hind-wings and cilia are pale ochreous-yellow.

The perfect insect appears in December and January. Described and figured from a specimen submitted by Mr. Philpott.

STATHMOPODA ARISTODOXA.

(*Stathmopoda aristodoxa*, Meyr., Trans. N.Z. Inst., lvi., 416.)

(Plate LI., fig. 11 ♂.)

This fine species has occurred in Gollan's Valley, near Wellington.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are very elongate, acutely pointed; dull greyish-bronze, with leaden-metallic reflections; there are three large

*Natural History of the Tineina, xii., 42.

oval snow-white spots on the termen, the first near the base, the second about the middle, and the third before the apex; the last-named spot is much suffused with orange-yellow; the divisions between the first and second spots are suffused with orange-brown. The hind-wings are grey. All the cilia are blackish. The head is purplish-brown; the thorax snow-white, narrowly margined with blackish anteriorly; the abdomen is brownish-black, barred with leaden-metallic. The antennae, palpi and legs are pale brown, the hind-legs are barred with blackish.

The perfect insect appears in November and frequents forest.

STATHMOPODA TRIMOLYBDIAS.

(*Stathmopoda trimolybdias*, Meyr., Trans. N.Z. Inst., lvi., 416.)
(Plate XLVIII., fig. 21 ♀.)

This species has occurred on the banks of the Manawatu River, near Ashhurst.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are deep orange-yellow; there are three leaden-black transverse blotches, the first near the base, the second before the middle, and the third beyond the middle; beyond the second blotch the whole wing is slightly suffused with brownish, especially on the costa. The hind-wings are brownish-grey. All the cilia are brownish-black, except on the apex and costa of the fore-wings where the cilia are orange-brown. The head is orange-yellow; the thorax lead-coloured speckled with yellow, and the abdomen brown, barred with lead colour.

The perfect insect appears in February and seems to be attached to open scrub.

STATHMOPODA PHLEGYRA.

(*Stathmopoda phlegyra*, Meyr., Trans. N.Z. Inst., xxi., 168;
Stathmopoda fusilis, ib. xlii. 111.)
(Plate XXXII., fig. 17 ♂.)

This very pretty little species appears to be common and generally distributed throughout the North Island. It has also occurred at Christchurch.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are bright ochraceous yellow with a grey shading along the costa from the base nearly reaching to the apex. The hind-wings and all the cilia are grey.

The larva, which is active in habit, feeds in the seed-heads of the common bullrush (*Typha angustifolia*) during the autumn and winter. Its length when full-grown is about three-sixteenths of an inch; it is cylindrical and slightly attenuated posteriorly with the head and second segment horny black and shining; the rest of the body is fleshy chocolate brown, paler on the back and between the segments; the last segment has a horny black dorsal plate; there are several rows of minute warts along the sides of the larva, each wart emitting a long stout bristle.

The perfect insect appears from October till January and in March and April, frequenting forests. It is also common in gardens and other cultivated places, and is attracted by light. It frequently enters houses, when it is often in evidence on window panes. When resting for a prolonged period the hind-legs are concealed beneath the wings, but at other times are generally held in the position peculiar to the genus.

Stathmopoda campylocha and *S. holochra* seem very closely allied to this species and may ultimately prove to be only varieties.

STATHMOPODA CAMPYLOCHA.

(*Stathmopoda campylocha*, Meyr., Trans. N.Z. Inst., xxi., 168.)

This species has occurred at Wellington and Dunedin. It is stated to be distinguished from the common *S. phlegyra* and allied forms by the presence of a dark brown V-shaped mark before the middle of the fore-wings, more or less suffused, variable in thickness, its angle touching the dorsum and its extremities nearly reaching the costa. The darker grey hind-wings and grey abdomen are also stated to be good distinguishing characters.

The perfect insect appears in January and February, and frequents forest.

I am unacquainted with this species.

STATHMOPODA HOLOCHRA.

(*Stathmopoda holochra*, Meyr., Trans. N.Z. Inst., xxi., 168.)
(Plate XXXII., fig. 20 ♀.)

This gaily-coloured little insect has been found at Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate, very narrow with the apex slightly curved downwards; very bright orange-ochreous without markings. The hind-wings are very pale whitish-ochreous with the apical cilia tinged with orange-ochreous, the rest of the cilia being pale brownish-ochreous.

The perfect insect appears in November and December. It seems to be a rare species.

STATHMOPODA SKELLONI.

(*Boocara skelloni*, Butl., Cist. Ent., ii., 562; *Stathmopoda skelloni*, Meyr., Trans. N.Z. Inst. xxi., 169.)
(Plate XXXII., fig. 16 ♂.)

Except in the extreme northern portions of the North Island, this delicate-looking species seems to be common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are silvery-white with four cloudy elongate dusky grey marks on the termen and dorsum, and one or two very indistinct longitudinal streaks near the middle of the wing. The hind-wings are dark brownish-grey, and all the cilia pale brownish-grey.

The dusky markings are variable and frequently almost obsolete.

The perfect insect appears from November till January, and frequents forests. It rests with the wings closed and slightly elevated posteriorly; the antennae are extended, somewhat curved outwards and backwards; both hind-legs are usually much elevated and thrust out sideways, the insect standing on the fore- and middle pairs; the palpi are generally held with their tips almost in contact.

STATHMOPODA CORACODES.

(*Stathmopoda coracodes*, Meyr., Trans. N.Z. Inst., liv., 167.)
(Plate XLIX. fig. 23 ♂.)

A few specimens of this very dark-looking species have occurred at Wellington and at Pieter.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are blackish with coppery reflections; there is a dull bronzy-yellow streak along the dorsum and termen and a minute oblique

mark before apex. The hind-wings are dull bronzy-grey. The head and thorax are bronzy-yellow.

Mr. Meyrick points out that the posterior tibiae are more densely and roughly clothed than in *Stathmopoda skelloni*, and that it is the darkest New Zealand species of the genus.

The perfect insect appears at midsummer.

STATHMOPODA MYSTERIASTIS.

(*Stathmopoda mysteriastis*, Meyr. Trans. Ent. Soc. Lond. 1901, 575; *Stathmopoda seminuda*, Philp., Trans. N.Z. Inst., xlix., 244.)

(Plate XXXVIII., fig. 5 ♀.)

This species has occurred at Auckland, Dunedin and Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The head, palpi and thorax are white. The fore-wings are leaden-brown, beneath fold white; there is also an indistinct broken whitish line in disc. The hind-wings and cilia of all the wings are dark grey.

The perfect insect appears in November and December, and seems to be rather rare.

Described and figured from a specimen kindly given to me by Mr. Philpott.

STATHMOPODA PLUMBIFLUA.

(*Stathmopoda plumbiflua*, Meyr., Trans. N.Z. Inst., xliii., 75.)

(Plate XXXII., fig. 21 ♂.)

This very distinct little species was discovered by Mr. Philpott at West Plains, near Invercargill. It has also occurred at Alexandra, Otago.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale whitish-ochreous; there are three fine, longitudinal, silvery-metallic streaks; the first below the costa, the second in the middle and the third along the fold; the first and second streaks extend almost the entire length of the wing; the third is very indistinct; there is a cloudy brownish basal area and three irregular patches of blackish-brown scales; the first on the fold, the second at about $\frac{2}{3}$ and the third just before the apex. The hind-wings are silvery-grey.

The perfect insect appears from November till April, and frequents open tussock lands, but is not a common species.

Described and figured from a specimen in Mr. Philpott's collection.

STATHMOPODA APOSEMA.

(*Stathmopoda aposema*, Meyr., Trans. Ent. Soc. Lond., 1901, 575.)

(Plate XXXVIII., fig. 6 ♀.)

This large species has occurred at Auckland, Wellington, Dunedin, and Lake Wakatipu. It is apparently very local.

The expansion of the wings is almost $\frac{1}{2}$ inch. The fore-wings are very pale brownish-ochreous; the costa is broadly edged with dull brownish-grey from the base to $\frac{1}{2}$; there is a longitudinal brown streak in the disc almost from the base to the apex; the dorsum is broadly edged with brownish-grey. The hind-wings are dark grey. The cilia of all the wings are dark greyish-ochreous.

The perfect insect appears in October, November and December and frequents forest. Mr. Charles E. Clarke,

to whom I am indebted for my first specimens, states that this species is common at Woodhaugh, near Dunedin, where it may be beaten out of the narrow-leaved lawyer vine (*Rubus cissoides*).

Genus 4.—PACHYRHABDA, Meyr.

Antennae in ♂ stout, simple. Hind-wings with vein 4 absent.

Includes a few species from India, Australia, and Africa, and represented in New Zealand by one species only.

PACHYRHABDA EPICHLORA.

(*Stathmopoda epichlora*, Meyr., Trans. N.Z. Inst., xxi., 169.)

This species has occurred at Auckland, Wellington and the Otira River.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are very narrow, broadest near base, long-pointed; whitish, more or less mixed with ochreous or grey in disc; markings rather dark fuscous but cloudy and ill-defined; a small spot on dorsum at $\frac{1}{2}$, a second more conspicuous on dorsum beyond middle, and an angulated fascia-like spot towards apex; cilia whitish-grey. Hind-wings and cilia whitish-grey.

A distinct but inconspicuous species.

The perfect insect appears in December and January, and frequents forest.

I am unacquainted with this species. The foregoing is taken from the original description.

Genus 5.—THYLACOSCELES, Meyr.

Antennae in ♂ stout, simple. Posterior tibiae with triangular tuft of scales on posterior half. Hind-wings with vein 4 present. (Plate H., figs. 10, 11, 12, 13, neuration, head and hind-leg of *Thylacosceles acridomima*.)

This interesting genus includes two New Zealand species and two from Ceylon. The peculiar tuft of hairs on the lower half of the hind tibiae may very possibly emit an agreeable perfume, and, in addition, perhaps, constitutes an element of sexual attractiveness, owing to its distinctive colour and striking appearance. It is, however, equally developed in both sexes.

THYLACOSCELES ACRIDOMIMA.

(*Thylacosceles acridomima*, Meyr., Trans. N.Z. Inst., xxi., 171.)

(Plate XXXIII., fig. 4 ♂, 5 ♀.)

This very interesting and remarkable little species appears to be common in all forest districts throughout the country.

The expansion of the wings is considerably over $\frac{1}{2}$ inch. The fore-wings are very elongate, broadest near the base, with the apex long-pointed, dull blackish-grey in the male and brownish-grey in the female, darker towards the apex; there is a very indistinct discal spot at about $\frac{1}{2}$. The hind-wings and cilia are grey. The very conspicuous tuft of hairs on the tibia of the hind-legs is slaty-blue, the spurs and bristles at the end of the tibia being pale ochreous. The hind-wings and all the cilia are grey.

The perfect insect appears from the beginning of October until the end of January, a late brood being sometimes found in April. It frequents rather dense forests,

where it is sometimes very abundant, especially early in the season. When at rest the wings are held flat and slightly extended from the body, with the tips divergent. The antennae are placed backwards on the top of the wings. The insect stands on its fore- and hind-legs, the latter being drawn forwards with the thickened hairy tibiae projecting beyond the costal margin. This quite breaks up the margin and gives the insect an unnatural appearance, with a possible resemblance to a small blackish lichen. The tarsi are irregularly placed and the palpi are curved inwards, their extremities almost touching in front of the head.

The specific name is very appropriate, having reference to the striking superficial resemblance of the hind-legs to those of a grasshopper.

Mr. Philpott points out that this insect appears to be attached to *Polystichum vestitum*.

THYLACOSCELES RADIANS.

(*Thylacosceles radians*, Philp., Trans. N.Z. Inst., 1, 129.)

(Plate XXXVIII, fig. 16 ♂, 17 ♀.)

This very interesting species was discovered by Mr. Philpott at Seaward Bush, near Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. Very like *T. acridomima*, of which it appears to be the southern representative but the fore-wings, in both sexes, are much narrower. The fore-wings of the male are grey, finely speckled and streaked with darker grey, and with two very obscure paler marks on the outer half of the dorsum. The hind-wings and cilia are grey. In the female the fore-wings are pale brownish-ochreous, with grey blotches in the middle of the dorsum and at the apex. The hind-wings and cilia are very pale greyish-ochreous. In both sexes the thickened tufts at the end of the hind tibiae are black.

The perfect insect appears in December and is fairly common in forest. Mr. Philpott considers that the food-plant of this species may be *Polypodium diversifolium*.

Described and figured from specimens kindly supplied by Mr. Philpott.

Sub-family 7.—COSMOPTERYGIDES.

Head smooth. Labial palpi long, recurved, acute. Maxillary palpi very short, appressed. Fore-wings with vein 1b furcate, 2 from near angle, 7 and 8 stalked, 7 to costa. Hind-wings lanceolate, 2-4 remote, parallel, 6 and 7 basally approximated or stalked. (Plate F, figs. 31-36.)

A considerable sub-family of general distribution, sparsely represented in New Zealand by the seven following genera:

- | | |
|-----------------|-----------------|
| 1. PYRODERCES. | 4. ZAPYRASTRA. |
| 2. THECTOPHILA. | 5. MICROCOLONA. |
| 3. LIMNOECIA. | 6. SYNTOMACTIS. |
| 7. BATRACHEDRA. | |

Genus 1.—PYRODERCES, Herr.-Schäff.

Labial palpi very long, slender, terminal joint longer than second. Fore-wings without tufts; veins 6 and 7 out of 8. (Plate F, figs. 31, 32, 33, neurulation and head of *Pyroderces apparitella*.)

Principally characteristic of the Indian and Australian regions.

There are three New Zealand species, all of which are confined to the North Island.

PYRODERCES APPARITELLA.

(*Gelechia apparitella*, Walk., Cat. xxx., 1027; *Proterocosma apparitella*, Meyr., Trans. N.Z. Inst. xxi., 174.)

(Plate XXVIII, fig. 22.)

This very beautiful, but fragile-looking insect has occurred at Kaco, Auckland, and Wellington. It is probably fairly common and generally distributed throughout the North Island.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which are elongate and very narrow with vein 5 separate and 6 present, are bright golden brown with very distinct clear white markings finely edged with black; there is a very fine line in the middle of the wing from the base to $\frac{1}{2}$; a rather broad line on the dorsum from the base, ending in a large white-edged yellowish patch, which is also connected with the costa by a winding black-edged white line; there are two other conspicuous very winding transverse lines, one before and one beyond the middle; another pale yellow mark on the dorsum beyond the middle; a small black-edged white mark is situated on the costa before the apex and a heavier mark at the apex. The hind-wings and all the cilia are grey with very faint pinkish reflections; veins 6 and 7 are stalked. The top of the head and the palpi are white; the antennae are also white with sharp black rings; the eyes are brilliant crimson.

The perfect insect appears in December and January, and frequents forests. It is also found in gardens and occasionally indoors. When at rest the wings are wrapped closely around the body, coming to a very sharp point. The antennae are curved outwards on each side; the palpi placed backwards over the head, the terminal joint reaching to the thorax. The insect stands on the tips of the tarsi of the fore- and intermediate legs, which are extended from the body, one hind tarsus also usually touches the ground, the other being elevated to the level of the wing. When the fore-wings are thus closed, the yellow dorsal markings of each join together and form one round and one elongate pale yellow spot on the back of the insect.

PYRODERCES AELLOTRICHA.

(*Proterocosma aellotricha*, Meyr., Trans. N.Z. Inst., xxi 175.)

This species was discovered by Mr. Meyrick at Hamilton.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate, very narrow, long pointed; vein 5 separate, 6 present; reddish-ochreous, tending to become whitish-ochreous round markings and towards base of dorsum; markings ochreous-white, closely irrorated with black; an irregular oblique fascia from $\frac{1}{2}$ of costa not reaching dorsum, emitting a short streak from posterior edge above middle; an irregular somewhat 8-shaped spot in middle of disc, from upper part of which proceeds an irregular streak to costa before apex; an irregular ochreous-whitish streak along termen from apex to tornus; a black apical dot; cilia light ochreous-greyish, round apex reddish-ochreous, with a blackish basal line and two blackish apical hooks. Hind-wings with veins 6 and 7 stalked; grey; cilia pale grey ochreous-tinged.

The perfect insect appears in January.

I am unacquainted with this species. The above has been taken from the original description.

PYRODERCES ANARITHMA.

(*Proterocosma anarithma*, Meyr., Trans. N.Z. Inst., xxi., 175.)
(Plate XXVIII., fig. 16.)

This clearly-marked little species has been found at Taranaki, Wanganui, Palmerston North, Napier, Master-ton, Kaitoke and Wellington.

The expansion of the wings is about five-sixteenths of an inch. The fore-wings are very elongate with vein 5 separate and vein 6 present; *bright brownish-ochreous with blackish markings; there is a small patch on the costa at the base; an elongate discal spot before the middle; a much smaller spot below this; a third elongate discal spot at about $\frac{1}{2}$ and a cloud of blackish scales near the apex.* The hind-wings, which have veins 6 and 7 from a point, are pale greyish-brown and the cilia of all the wings are dark grey.

There are sometimes two or three additional indistinct dots on the fore-wings and generally two small, indistinct, whitish-ochreous spots on the costa and dorsum.

The perfect insect appears from December till March, and is often locally abundant, flying freely in the late afternoon amongst bracken (*Pteridium aquilinum*). Owing to its small size it is best obtained by sweeping. Mr. Meyrick states that it is very widely distributed throughout Australia, from east to west, but, there also, is locally common in some places only.

Genus 2.—THECTOPHILA, Meyr.

Head smooth; ocelli posterior; tongue developed. Antennae, basal joint elongate, rather dilated towards apex, without pecten (?). Labial palpi very long, recurved, slender, smooth, terminal joint as long as second, acute. Maxillary palpi obsolete. Posterior tibiae clothed with hairs above. Fore-wings with vein 10 simple, 2 from angle, 2-4 parallel, 5 absent, 6 and 7 out of 8, 7 to costa, 11 from middle. Hind-wings three-fifths, lanceolate, cilia 3; veins 2-4 parallel, 5 absent, 6 and 7 stalked.

Apparently a development of *Pyroderces*.

Represented by one species only.

THECTOPHILA ACMOTYPA.

(*Thectophila acmotypa*, Meyr., Trans. N.Z. Inst., lvii., 701.)
(Plate LII., fig. 18 ♀.)

This species was discovered on Arthur's Pass at an altitude of about 4,000 feet above sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. All the wings are lanceolate, with the apices acutely pointed; *creamy-white.* The fore-wings are narrowly edged with ochreous, *with a black streak at the apex terminating in a tuft of black cilia;* remainder of cilia whitish. The body is relatively stout and the legs short.

The perfect insect appears in February, and was found amongst rough herbage on the mountain side.

Genus 3.—LIMNOECIA, Stt.

Labial palpi very long, slender, terminal joint longer than second. Fore-wings without tufts, 6 separate.

A genus of some extent, with the same distribution as *Pyroderces*.

Represented in New Zealand by a single, very widely-distributed species.

LIMNOECIA PHRAGMITELLA.

(*Limnoecia phragmitella*, Stt., Cat. Brit. Tin. Suppl. 4; Meyr., Trans. N.Z. Inst., xxi., 173.)

A single specimen of this species was found by Mr. Meyrick amongst the swamps of the Waikato at Hamilton.

The expansion of the wings is from $\frac{1}{2}$ to about $\frac{3}{4}$ inch. The fore-wings are elongate, very narrow, long-pointed; whitish-ochreous, brownish-tinged; a round dark fuscous dot in disc before middle, and a second at $\frac{3}{4}$, tending to be ringed with ochreous-whitish: cilia whitish-ochreous. Hind-wings pale grey ochreous-tinged: cilia whitish-ochreous.

The larva is yellow-whitish, with fine brownish longitudinal lines. It feeds in the seedheads of the bullrush (*Typha angustifolia*) burrowing amongst the seeds, and causing the down to hang out in loose masses, exactly in the manner of *Scieropepla typhicola*.

The perfect insect appears in January.

Mr. Meyrick remarks: "I have also taken it in New South Wales. The species occurs in Central Europe, but is not very widely known, probably owing to the retired habits of the imago. My specimens are the only ones taken outside Europe; yet as it is hardly conceivable that the species should have been artificially introduced, and as the *Typha* is thought to be indigenous in suitable localities all round the world, I conjecture that the insect may be truly cosmopolitan. The light down of the seedheads, carrying the seeds of the plant and the ova of the insect, must be exceedingly susceptible of dessemination by the wind."

All the above particulars have been extracted from Mr. Meyrick's description.

Genus 4.—ZAPYRASTRA, Meyr.

Labial palpi moderate, slender, terminal joint shorter than second. Fore-wings with slight tufts of scales; vein 6 separate, 9 absent. Hind-wings with 5 and 6 stalked. (Plate F., figs. 34, 35 and 36 neuration and head of *Zapyrastra calliphana*.)

The single species is perhaps Australian by origin.

ZAPYRASTRA CALLIPHANA.

(*Zapyrastra calliphana*, Meyr., Trans. N.Z. Inst., xxi., 172.)
(Plate XXVIII., fig. 20.)

This refulgent little insect has occurred at Wellington, Christchurch, Bealey, Otira River, Dunedin and Invercargill.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch, of the female about five-sixteenths of an inch. The fore-wings are rather elongate, pointed at the apex; dark shining greenish-bronze; there is a small brilliant silvery-pink iridescent mark near the base; two indistinct spots at $\frac{1}{2}$ and $\frac{3}{4}$, often confluent, thus forming two transverse bands; an elongate spot below the apex and a clear white triangular spot on the costa before the apex. The hind-wings and all the cilia are dark brownish-grey. The head, body and legs are shining greenish-bronze, the legs being spotted with white. In some lights the silvery pink markings on the fore-wings appear metallic blue.

The perfect insect appears from October till February, and is occasionally met with amongst open forest or scrub. Mr. Meyrick states that it is rather common amongst *Leptospermum*, on which its larva must certainly feed. The

species is common also in New South Wales and Tasmania, frequenting the same plant from September till April. When at rest the antennae are extended side-ways and slightly forwards; the anterior legs placed outwards on each side of the head; the hind-legs extended outwards and backwards and slightly raised, and the posterior portions of the insect, including the wings, also slightly raised.

Genus 5.—MICROCOLONA, Meyr.

Labial palpi long, loosely scaled, terminal joint shorter than second. Fore-wings with tufts of scales; vein 4 absent, 6 out of 7 or absent. Hind-wings with 3 absent, 4 usually absent.

Fairly developed in Australian and Indian regions, but the species are easily overlooked. There are two species in New Zealand.

MICROCOLONA LIMODES.

(*Microcolona limodes*, Meyr., Proc. Linn. Soc. N.S.W., 1897, 372.)

Three specimens of this species were discovered by Mr. Meyrick at Christchurch.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The head is whitish, crown somewhat fuscous-sprinkled. Palpi whitish, medial band and sub-apical ring of second joint, and sub-basal and sub-apical rings of terminal joint blackish. Antennae whitish, faintly fuscous ringed. Thorax whitish, somewhat fuscous-sprinkled. Abdomen ochreous-whitish. Legs dark fuscous ringed with whitish, posterior pair ochreous-whitish with a blackish band on tibiae near base. Fore-wings whitish-ochreous, irregularly sprinkled with dark fuscous, a dark fuscous tuft beneath fold at $\frac{1}{2}$; stigmata small, raised, black, first discal before middle, second at $\frac{1}{4}$, plical obliquely beyond first discal, almost dorsal; a raised dark fuscous dot beneath second discal; a dark fuscous suffusion on costa about $\frac{3}{4}$; cilia whitish-ochreous, at apex, with a fuscous median line. Hind-wings grey-whitish; cilia whitish-ochreous.

The perfect insect appears in March.

I am unacquainted with this species. The above is copied from the original description.

MICROCOLONA CHARACTA.

(*Microcolona characta*, Meyr., Proc. Linn. Soc. N.S.W., 1897, 374.)

(Plate XXVIII, fig. 8.)

This rather delicate-looking little species has occurred at Wellington and at Nelson.

The expansion of the wings is considerably over $\frac{3}{4}$ inch. The fore-wings are very elongate and narrow with the apex pointed; brownish-ochreous with black markings; there is a series of elongate marks on the costal edge, extending from the base to about $\frac{3}{4}$, followed by a row of indistinct dots; two black discal dots are placed obliquely near the middle and two considerably beyond the middle. The hind-wings and cilia are very pale grey.

Some specimens have the fore-wings heavily sprinkled with blackish scales and in these the discal dots have pale rings.

The perfect insect appears in September and October and is found in forests. It seems to be rare, but owing to its small size is probably often overlooked.

This species also occurs in Australia.

Genus 6.—SYNTOMACTIS, Meyr.

Labial palpi long, second joint with projecting whorls of scales, terminal joint as long as second, roughened anteriorly. Fore-wings with tufts of scales; veins 7 and 8 out of 6.

A considerable genus, characteristic of Australia, but represented in New Zealand by one species only.

SYNTOMACTIS DEAMATELLA.

(*Syntomactis deamatella*, Walk., Cat. xxix., 654; Meyr. Trans. N.Z. Inst., xxi., 173.)

(Plate XXVIII, fig. 18.)

This beautiful and striking species has occurred at Takaka, Christchurch, Poherua near Greymouth, Lake Wakatipu, and Invercargill, but appears to be very rare.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale brownish-grey, thickly sprinkled with black scales; there is a large triangular snow-white patch on the costa at $\frac{1}{4}$; a very large oval snow-white patch slightly beyond the middle and a white bar before the apex; the black scaling is very dense on the costa, around the white markings, and on a spot near the apex. The hind-wings are very pale brownish-grey.

The perfect insect appears from December till March, and is found in forest.

Described and figured from a specimen in Mr. Philpott's collection.

Genus 7.—BATRACHEDRA, Stt.

Head with appressed scales. Labial palpi bent, ascending, pointed, with scales of second joint somewhat angularly projecting beneath at apex. Maxillary palpi rudimentary. Fore-wings with vein 5 absent, 7 to costa, 8 absent. Hind-wings linear-lanceolate. (Plate H., figs. 39, 40, 41 neuration and head of *Batrachedra agaura*.)

A genus of some extent, principally Indo-Australian, and represented in New Zealand by six species. Two are restricted to the North Island; one to the South Island, and three occur in both islands.

BATRACHEDRA PSATHYRA.

(*Batrachedra psathyra*, Meyr., Trans. N.Z. Inst., xxi., 181; *Batrachedra psathyra*, lb. liv., 167.)

(Plate XXXV, fig. 13 ♂; Plate XLIV, fig. 8 ♀.)

This very delicate-looking little species has occurred at Kaero, Auckland, Hamilton, Wellington, Nelson, Christchurch and Queenstown.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings of the male are very elongate-elliptical, white, thickly strewn with minute ochreous-brown spots towards the apex; there is a blackish spot on the fold, and a black spot and crescent of black cilia at the apex. The hind-wings are grey. The cilia of all the wings are very pale brownish-ochreous.

In the female there are about six orange-yellow spots along the costa, several much smaller spots on the termen and two in the disc, as well as an elongate blackish spot on the fold near the base; the whole wing is speckled with black, especially towards the base and around the orange spots.

The perfect insect appears from the middle of November until the first week in January and, for a very short season, is often extremely abundant. It is found on rough overgrown grass lands and fern hills near forest, flying

freely about sunset when its white colouring makes it fairly conspicuous. It is very common in the upper portion of the Wellington Reservoir Reserve at Karori. This insect rests with the fore part much raised, like a *Gracilaria* and, when about to move, swings alternate antennae.

BATRACHEDRA TRISTICTA.

(*Batrachedra tristicta*, Meyr., Trans. Ent. Soc. Lond., 1901, 579.)

Two specimens of this species were taken by Mr. Meyrick at Makotuku.

The expansion of the wings is about $\frac{5}{8}$ inch. Head, antennae, thorax, abdomen, and legs fuscous-whitish. Palpi whitish, second joint with short scale-projection, sub-basal and sub-apical spots of second joint, and basal and sub-apical spots of terminal dark fuscous. Fore-wings whitish, irrorated with fuscous and sprinkled with dark fuscous; first and second discal stigmata elongate, black, first somewhat before middle; a round black apical dot: cilia very pale whitish-fuscous. Hind-wings grey; cilia pale whitish-fuscous.

The perfect insect appears in March.

I am unacquainted with this species. The above is a copy of the original description.

BATRACHEDRA ARENOSELLA.

(*Gracilaria arenosella*, Walk., Cat. xxx., 857; *Batrachedra arenosella*, Meyr., Trans. N.Z. Inst., xxi., 181.)

(Plate XXXV., fig. 12.)

This very frail-looking species has occurred at Palmerston North, Wellington, Christchurch and Invercargill.

The expansion of the wings is seven-sixteenths of an inch. The antennae are broadly barred with dark brown towards the apex. The fore-wings are elongate, very narrow, with veins 6 and 7 separate; pale brownish-ochreous with numerous scattered dark brown dots thickest towards the costa and apex; there is a cloudy brown spot in the disc at two-fifths and another at four-fifths sometimes obsolete. The hind-wings, which have veins 2, 3 and 5 absent, are ochreous-grey. The cilia of all the wings are pale greyish-ochreous.

According to Mr. Meyrick the larva feeds amongst the seeds of rushes (*Juncus*), joining them together with a slight web, in August. The pupa, which is very slender, is enclosed in a cocoon amongst the seeds. Dr. J. G. Myers has observed this larva feeding on scale insects (*Poliaspis media*).

The perfect insect appears from January till March, and is found in swampy places where rushes are abundant. Mr. Meyrick states that it is also common and generally distributed in Australia, which is doubtless its place of origin. The species is very closely allied in every way to the European *Batrachedra pinicolella*. The position assumed when at rest is the same as that of *Gracilaria*.

BATRACHEDRA EUCOLA.

(*Batrachedra eucola*, Meyr., Trans. N.Z. Inst., xxi., 180.)

(Plate XXXIV., fig. 8.)

This species was discovered by Mr. Meyrick at the Bealey River, in January, 1883. It was rediscovered by Mr. Philpott, at the Aorere River near Nelson, in February, 1926.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate, parallel-sided, with the apex acutely pointed slightly downwards; very pale brownish-ochreous with brown markings; veins 6 and 7 stalked; there are two elongate cloudy brown streaks, one along costa and one immediately below; a third much finer streak in disc; a suffused brownish spot on dorsum near base; two conspicuous elongate dots placed obliquely in disc, and a third oblique dot at about $\frac{3}{4}$; four minute dots in cilia on outer third of costa, and one at apex; rest of cilia grey mixed with brownish-ochreous. The hind-wings are grey, with the cilia before apex bright brownish-ochreous; the rest of cilia grey.

Mr. Meyrick points out that this species may be easily distinguished by its large size, very pronounced tuft of palpi, and full neuration of hind-wings.

The perfect insect appears in January and February, but is evidently extremely rare.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

BATRACHEDRA AGAURA.

(*Batrachedra agaura*, Meyr., Trans. Ent. Soc. Lond., 1901, 579.)

(Plate XXXV., fig. 2 ♀.)

This obscurely-marked species has occurred in many localities between Kaeo in the far north and Invercargill in the south. It is evidently generally distributed throughout the country.

The expansion of the wings is about $\frac{5}{8}$ inch. The fore-wings, which are very elongate parallel-sided with the apex rather abruptly pointed, are dull yellowish-brown thickly speckled and clouded with darker brown; there are several obscure dark brown marks on the fold, a rather distinct discal spot beyond the middle and another beyond the end of the fold; three dots are situated on the costa before the apex and a small distinct black mark on the cilia at the apex. The hind-wings are brownish-grey.

There is considerable variation in the depth of the ground colour and markings.

The perfect insect appears in December, and frequents dense forests, but although generally distributed is not a common species.

BATRACHEDRA FILICICOLA.

(*Batrachedra filicicola*, Meyr., Trans. N.Z. Inst., xlix., 247.)

(Plate XL., fig. 11 ♂, 12 ♀.)

This very fragile-looking insect was discovered amongst tree-ferns at Karori.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings are elongate-elliptical in the male, dark grey speckled with blackish; there are three rows of large black scales at the apex, the last row forming a blunt termination to the wing; the cilia are blackish and very long. The hind-wings are extremely narrow, pointed, dark grey with very long cilia. The antennae of the male are about three quarters the length of the fore-wings, rather stout, black. In the female the wings are silvery-grey speckled with darker; and the antennae are grey slightly shorter and more slender than in the male.

The perfect insect appears in November and December, and may be swept from the fronds of the silver tree-fern (*Cyathea dealbata*), in hot sunshine. It runs fast and flies rapidly with short flights. It is probably on the wing for a brief period and hence may often escape notice.

Sub-family 8.—GLYPHIPTERYGIDES.

Head with appressed scales. Basal joint of antennae without pecten. Labial palpi moderate, curved, ascending, terminal joint compressed, pointed or obtuse. Maxillary palpi rudimentary. Fore-wings with veins 7 and 8 separate or stalked. Hind-wings ovate or elongate-ovate; 3 and 4 connate, 5-7 somewhat approximated towards base or nearly parallel. (Plate H., figs. 18-26.)

A considerable sub-family, more especially characteristic of the equatorial region and Southern Hemisphere, except Africa. Many of the species fly by day and are ornamented with brilliant metallic markings.

The following seven genera are represented in New Zealand:

- | | |
|------------------|------------------|
| 1. CORIDOMORPHA. | 5. CHOREUTIS. |
| 2. HIERODORIS. | 6. PANTOSPERMA. |
| 3. HELIOTIBES. | 7. GLYPHIPTERYX. |
| 4. SIMAETHIS. | 8. CHARIXENA. |

Genus 1.—CORIDOMORPHA, Meyr.

Basal half of antennae thickened with dense scales in female. Labial palpi long, second joint with appressed scales, terminal joint shorter, acute. Fore-wings with 7 and 8 stalked, 7 to costa.

A remarkable endemic genus represented by one species only.

CORIDOMORPHA STELLA.

(*Coridomorpha stella*, Meyr., Trans. N.Z. Inst., xlv., 111.)
(Plate XXXIII., fig. 7 ♂, 8 ♀.)

This very remarkable and interesting species was discovered by Stella Hudson at Kauri Gully near Auckland, and other specimens have subsequently been found at Rauimu and at Karori, near Wellington.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are rather broadly triangular with the costa strongly arched near the middle and the termen oblique; blackish-grey in the female very thickly speckled with pale metallic-green scales on the basal and terminal areas and with bluish-white scales in the disc; there is a broad cloudy transverse band at $\frac{1}{3}$, darker on the costa and a conspicuous broad oblique bar at $\frac{2}{3}$ extending from the costa to the middle of the wing, both these markings having purplish reflections. The hind-wings are deep bronzy-brown with two divergent golden-yellow streaks; the cilia are pale golden-yellow with blackish patches at the apex and tornus. The antennae are thickened with heavy black scales on the basal half, the central portion is golden-yellow and the apex black. In the male the fore-wings are an almost uniform blackish-brown with indistinct darker transverse bands, the spaces between them being sparsely sprinkled with bluish-white scales; the hind-wings have the yellowish streaks much less distinct than in the female and the basal half of the antennae is not thickened with scales.

The perfect insect appears in January, and frequents forest. When at rest, or walking, the fore-wings are closed over the back, forming a rather flattened roof, and the apical third of each wing is bent sharply downwards. This peculiarity, combined with the remarkable antennae, causes the female insect to resemble *Oxychilophora marginicollis*, a hemipteron belonging to the family *Capsidae*, and as these bugs have a most objectionable taste and odour, it seems almost certain that the resemblance of the moth is an instance of protective mimicry.

Genus 2.—HIERODORIS, Meyr.

Labial palpi with appressed scales, terminal joint shorter than second, pointed. Fore-wings with vein 7 absent.

Another endemic genus represented by four species. Three are confined to the South Island, and one to the North Island.

HIERODORIS IOPHANES.

(*Hierodoris iophanes*, Meyr., Exot. Micr., i, 42; Trans. N.Z. Inst., xlv., 27.)

(Plate XXXIII., fig. 3 ♂.)

This very handsome little insect has occurred at Kai-toko and at Wellington, but appears to be very rare.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are deep greenish-bronze with coppery-bronze reflections and purplish-metallic blue markings; there is a rather large patch at the base; a small mark on the costa at about $\frac{1}{4}$; an oblique band from the costa before the middle meeting a pale ochreous spot on the middle of the dorsum; an elongate bluish-white discal dot; an irregular slender crescentic mark at about $\frac{2}{3}$ and a large irregular patch of pinkish-purple-metallic scales on the termen. The hind-wings are very deep brown with faint bronzy reflections.

The perfect insect appears from November till February. It is found in open glades amongst forest, or scrub, and flies very actively in the hottest sunshine.

HIERODORIS STELLATA.

(*Hierodoris ? stellata*, Philp., Trans. N.Z. Inst., i, 129.)

(Plate XXXVIII., fig. 21.)

This very striking species was discovered by Mr. C. C. Fenwick at Bluecliff, Fiord County.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The forewings are broad, with the costa rather strongly arched; rich chocolate-brown with very conspicuous cream-coloured markings; there is an irregular marking near the base; a very large irregular horseshoe-shaped marking on the dorsum near the middle followed by an oblique interrupted series of spots extending to the apex; there is a small spot on the costa at $\frac{1}{4}$ and a small ring of spots below the costa near the middle as well as a streak on the tornus; the cilia are cream-coloured except near the apex and on each side of the tornus. The hind-wings are blackish-brown paler near the base.

There is some resemblance between the colouring and markings of this species and of the Trichopteron *Polyplectropus puerilis*.

The perfect insect appears in January, and apparently frequents forest near the sea-coast.

Described and figured from the unique specimen in the Fenwick collection.

HIERODORIS FRIGIDA.

(*Hierodoris frigida*, Philp., Trans. N.Z. Inst., liv., 153.)

(Plate XLIX., fig. 16 ♂.)

This brilliant little insect was found by Mr. Philpott on the Dun Mountain, near Nelson, at an elevation of 3,000 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are deep brownish-black; there is a short violet-metallic bar from the costa near the middle and a longer bar beyond the middle; the sub-basal and sub-terminal areas are heavily sprinkled with elongate white scales. The hind-wings are deep brown.

The perfect insect appears in January, and flies low beneath *Leptospermum* and other shrubs.

Described and figured from a specimen kindly given to me by Mr. Philpott.

HIERODORIS INSIGNIS.

(*Hierodoris insignis*, Philp., Trans. N.Z. Inst., lvi., 397.)
(Plate LII., fig. 31 ♀.)

This very robust, distinctly-marked species was discovered by Mr. S. Lindsay, on the Tableland of Mount Arthur, at an altitude of 4,000 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate-oval with the apex rather blunt; dull white heavily strewn with greyish scales, with thick black markings; a broad bar on costa near base; a strongly-curved constricted black band from before middle of costa to near termen at $\frac{3}{4}$; a large round black spot beyond this; a large black blotch on outer third of costa, hardly touching the round spot; a cloudy brownish-black spot at apex; a shaded purplish patch on dorsum at base. The hind-wings are grey finely dotted with darker grey. The head, thorax and abdomen are very stout, purplish-black. The hind-legs are black barred with dull white.

The perfect insect appears in January.

Described and figured from specimen submitted by Mr. Philpott.

Genus 3.—HELIOSTIBES, Zell.

Labial palpi with appressed scales, terminal joint shorter than second, acute. Fore-wings with vein 7 and 8 stalked, 7 to apex. (Plate H., figs. 21, 22, 23 neuration and head of *Heliostibes atychioides*.)

This is a small genus, essentially characteristic of New Zealand, the single species known elsewhere being found in Chili. Its members are all active insects of diurnal habits, and fly with a rapid mazy flight in the hottest sunshine. There are six New Zealand species, of which one is confined to the North Island, three to the South Island, and two occur in both islands.

HELIOSTIBES CALLISPIORA.

(*Heliostibes callispora*, Meyr., Exot., Micr., i., 41;
Trans. N.Z. Inst., xlv., 27.)
(Plate XXXIII., fig. 24.)

This very distinct species was discovered at Wainuiomata, and has occurred at several other places near Wellington, but is a rare insect.

The expansion of the wings is $\frac{1}{2}$ inch. The palpi are orange-brown and the neck has a collar of orange-yellow scales. The fore-wings are triangular very deep indigo-brown thickly strewn with pale greenish-yellow hair scales. The hind-wings are dark bronzy-brown.

The perfect insect appears in December, and is found in scrub where *Mühlenbeckia* is abundant. Like the other members of the genus it flies freely in hot sunshine.

HELIOSTIBES ELECTRICA.

(*Heliostibes electrica*, Meyr., Trans. N.Z. Inst., xxi., 157.)
(Plate XXXIII., fig. 26 ♀.)

This very distinct silver-marked species has occurred in the South Island at Mount Arthur, Lake Tekapo, Lake Wakatipu, and Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are dark blackish-brown irregularly strewn with elongate ochreous scales; there is an obscure metallic transverse line near the base; a wavy, silver-metallic line from above the middle of the wing to the dorsum before the tornus; another curved metallic line encircles a very large black patch on the costa at about $\frac{3}{4}$ and a fourth metallic line runs parallel with the termen; a clear white spot is situated on the costa near the middle and another just before the apex. The hind-wings are dark grey.

The perfect insect appears from the middle of December until the end of February, and delights in the hottest sunshine. It seems to be a very rare and local species, except in the extreme south, where Mr. Philpott states it is not uncommon. It was discovered in the year 1886, by Mr. Meyrick, on Mount Arthur, at an elevation of 4,700 feet above the sea-level, but since then it has not been observed in that locality.

HELIOSTIBES ATYCHIOIDES.

(*Tachyptilia atychioides*, Butl., Proc. Zool. Soc. Lond., 1877, 405, pl. xliii., 14; *Heliostibes atychioides*, Meyr., Trans. N.Z. Inst., xx., 88.)

(Plate XXXIII., fig. 23 ♀; Plate III., fig. 13 larva.)

This very active, dark-coloured, sun-loving insect is common and generally distributed throughout the country.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings, which are rather elongate and somewhat dilated posteriorly, are dark blackish-brown very thickly streaked with ochreous-brown; there are usually two or three large, irregular, black spots in the disc, often surrounded by a cloudy white shading. The hind-wings are very dark brown.

Considerable variation exists in the presence or absence of distinct markings on the fore-wings and the general ground colour is very rarely replaced by dull orange-brown.

The larva when full-grown is about $\frac{1}{2}$ inch in length, cylindrical and slightly attenuated behind. The head is dark brown with two broad black stripes; the second segment is very horny, dark brown, paler beneath, with a white dorsal stripe; the third and fourth segments have horny dorsal plates; the remaining segments are yellowish-brown, sometimes slightly purplish-tinted, with a very conspicuous dorsal line and a row of large white-edged black spots on each side of it; there are two rather irregular, whitish, lateral lines with a series of horny tubercles between them.

The larva feeds in the terminal shoots of the manuka (*Leptospermum scoparium*) and tauhinu (*Cassinia*), which it joins together forming a gallery composed of silk and refuse. Within this retreat it feeds during the winter, becoming full-grown about the end of October. The larva is gregarious, several living in the same shoot, and where found is often very abundant. It is active in its habits, and eludes capture by wriggling along the gallery, from which it often escapes and drops to the ground, and thus no doubt avoids destruction by birds. In gardens and other cultivated places it feeds in the young shoots of *Cupressus macrocarpa*, which it joins together in the same way as those of the manuka or tauhinu.

The pupa is enclosed in a small cocoon within one of the silken galleries.

The perfect insect appears in December and January and, although rather local, is generally very abundant where found. It is diurnal in its habits and flies with great activity in the hottest sunshine.

HELIOSTIBES ILLITA.

(*Atychia illita*, Feld., Reis. Nov., pl. cxi., 32; *Helioctibes illita*, Meyr., Trans. N.Z. Inst., xx., 83.)

(Plate XXXIII., fig. 25 ♀.)

This very handsome species has occurred at Palmerston North, Kaitoke, Silverstream, Wainuiomata, Nelson, Dunedin, and Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are very rich dark brown, thinly speckled with elongate bluish-white scales; there are usually cloudy discal marks before and beyond the middle, and a darker curved terminal band. The hind-wings are rich velvety-black, with two unequal elongate-triangular bright orange-yellow marks, and a cloud of minute yellow dots near the tornus. The cilia of the hind-wings are bright orange-yellow.

There is considerable variation in the colour of the fore-wings which is sometimes a uniform deep reddish-brown without markings, intermediate varieties occurring between this and typical form.

The perfect insect appears from November till February, and in some seasons is locally abundant. It flies very actively, with a mazy flight, over the tops of high bushes in the hottest sunshine. I have often thus observed it over high tutu shrubs (*Coriaria ruscifolia*) on which its larva may possibly feed. Mr. Meyrick states that it flies over the tops of high manuka trees (*Leptospermum ericoides*.)

HELIOSTIBES CHLOROBELA.

(*Helioctibes chlorobela*, Meyr., Trans. N.Z. Inst., liii., 334.)

(Plate XLIX., fig. 27 ♂, 28 ♀.)

This species has occurred on Mount Arthur at an elevation of about 3,500 feet above the sea-level.

The expansion of the wings of the male is $\frac{3}{4}$ inch; of the female almost 1 inch. The male is very like the same sex in *H. illita*, but has no orange colour on the hind-wings. The female also closely resembles *H. illita*, but is paler with the orange colour of the hind-wings almost absent. In both sexes the terminal joint of the palpi is hardly half as long as the second joint but in *H. illita* the terminal joint is about $\frac{2}{3}$ the second.

The perfect insect appears in January. It may be looked for in glades in subalpine forest.

HELIOSTIBES VIBRATRIX.

(*Helioctibes vibratrix*, Meyr., Trans. N.Z. Inst., lvii., 702.)

(Plate L., fig. 21 ♀.)

This very obscurely-marked, stout-looking little insect, has occurred on Mount Arthur, at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is nine-sixteenths of an inch. The fore-wings are oblong, dull grey, very slightly brassy-tinged; there is a black discal dot at about $\frac{3}{4}$ and a series of very obscure wavy blackish transverse lines, forming suffusions near base, near middle of costa, and before tornus. The hind-wings are deep brownish-black. All the cilia are blackish-grey.

The perfect insect appears in January, frequenting the open mountain side.

Genus 4.—SIMAETHIS, Leach.

Labial palpi with second joint more or less roughly scaled, terminal joint shorter, thickened with scales, obtuse. Fore-wings with vein 7 to termen. (Plate H., figs. 18, 19, 20 neurulation and head of *Simaethis combinatana*.)

The insects comprised in this genus are mostly dark coloured of small size, with speckled white, or purplish-white, transverse bands. They are generally sun-lovers, flying actively in the sunshine, and often resting on leaves or blossoms exposed to the sun. Whilst thus engaged the fore-wings are placed backwards and held slightly folded in a horizontal position, almost covering the hind-wings.

This genus is of considerable size, and most numerously represented within the tropics. We have fifteen species in New Zealand, some of which are extremely difficult to discriminate. Of these two are restricted to the North Island; ten to the South Island, and three are common to both islands.

SIMAETHIS EXOCHA.

(*Simaethis exocha*, Meyr., Trans. N.Z. Inst., xxxix., 120.)

(Plate XXXIII., fig. 31 ♀.)

This large and very distinct species was discovered on the Humboldt Range at the head of Lake Wakatipu and has not yet been recorded from any other locality.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings, which are rather narrow with the costa almost straight, the apex acute and the termen obliquely rounded, are very dark grey; there is a large irregular basal patch thickly speckled with white scales and containing an oblique black mark extending almost from the costa to the dorsum and followed by an angulated white line; a large somewhat semicircular white mark is situated on the costa before the apex, encircling a dark blackish-grey patch; there is a broad, wavy, oblique, speckled-white sub-terminal band internally bordered by a clear white line; inside this line there are two triangular black marks, one near the disc and the other on the dorsum. The hind-wings are grey, darker near the apex.

The perfect insect appears in January, and frequents sub-alpine veronicas at an elevation of about 3,600 feet above the sea-level, where it flies at evening dusk. It is evidently a rare and local insect.

SIMAETHIS COMBINATANA.

(*Simaethis combinatana*, Walk., Cat., xxviii., 456; Meyr., Proc. Linn. Soc. 1880, 213; *Simaethis abstitella*, Walk. Cat., xxx. 997; *Simaethis zomeuta*, Meyr., Trans. N.Z. Inst., xlv. 121.)

(Plate XXXIII., fig. 29 ♀; Plate III., fig. 32 larva.)

This robust-looking little insect has occurred at Kaeo, Waimarino, Ohakune, Wellington, Mount Arthur and the Otira River.

The expansion of the wings varies from $\frac{1}{2}$ to $\frac{3}{4}$ inch. The fore-wings, which are oblong with the termen slightly oblique, are rich brown with the basal central and terminal areas darker; there are a few purplish white scales at the base; a wavy line of purplish-white scales on the edge of the basal area, two similar lines on the edges of the central area; a rather broad band of purplish-white dots between the central and terminal areas and a few scattered dots close to the termen. The hind-wings, which have the termen strongly concave near the middle, are

rich dark brown, slightly paler towards the base; there are two short pale coloured longitudinal marks at the tornus.

Considerable variation exists in size as well as in the general colouring, which is much darker and richer in some specimens than in others. The very pale individuals occasionally met with may possibly be faded specimens, although in other respects they appear to be in good condition. Generally speaking, the female is larger and paler than the male.

The larva feeds on the young shoots of *Erechtites prenanthoides*, drawing the tops of the plant together and forming silken galleries amongst the leaves. It also feeds on wharangi (*Brachyglottis repanda*), but when living on this plant it shelters itself under a silken curtain on the upper surface of the large flat leaves, eating the fleshy portions only. It is somewhat stout, slightly tapering at each end. The head and first segment are pale brown and horny; the rest of the body being pale greenish-ochreous. Each segment is provided with eight black warts arranged in two rows consisting of two and six respectively. Each of these warts gives rise to a small black bristle. The length of the larva when full-grown is about $\frac{1}{2}$ inch.

The pupa is enclosed in a dense white cocoon amongst the withered leaves of the foodplant.

The perfect insect is double-brooded, first appearing from September till November, and then from February till April. Stragglers are, however, occasionally met with between these times and are evidently early or late individuals. It is sometimes fairly common, and is fond of resting on leaves and basking in the sunshine. Whilst thus engaged the fore-wings are placed backwards, somewhat puckered and slightly elevated; the hind-wings are almost hidden, and the antennae extended; a somewhat rectangular open space is left behind the thorax owing to the shape and position of the wings. When flying this insect has a peculiar fussy manner, and in this respect closely resembles some of its European congeners.

A very large variety of this species, almost $\frac{3}{4}$ inch in expanse of wings, is often found in mountainous districts and was described as a distinct species under the name of *Simaethis zomeuta*. Specimens of intermediate size, however, often occur which completely connect *S. zomeuta* with the ordinary form of *S. combinatana*.

SIMAETHIS COLPOTA.

(*Simaethis colpota*, Meyr., Trans. N.Z. Inst., xliii., 67.)

(Plate XL, fig. 14 ♀.)

This species was discovered at Invercargill by Mr. Philpott.

The expansion of the wings is about $\frac{1}{2}$ inch. It is very like *Simaethis combinatana* but is a much duller-looking insect; the scattered whitish scales are not distinctly tinged with blue as in that species, and there is a very elongate linear discal mark followed by an irregular, strongly outwards-curved, transverse line.

The perfect insect appears from December till March, and is stated to be rather rare.

Described and figured from a specimen in Mr. Philpott's collection.

SIMAETHIS IOCHONDRA.

(*Simaethis iochondra*, Meyr., Trans. N.Z. Inst., xliii., 77.)

(Plate XXXIII., fig. 1 ♂, 2 ♀.)

This very distinct though dull-coloured species was first discovered in the North Island on Mount Holdsworth, Taranaki Range, and has since occurred in the South Island on the Mount Arthur Tableland.

The expansion of the wings of the male is nearly $\frac{1}{2}$ inch, of the female slightly over $\frac{1}{2}$ inch. In the male the fore-wings, which have the costa rather arched and the apex obtuse, are dull blackish-brown, considerably paler near the middle; the basal area is faintly dotted with purplish-white scales; there is a faint whitish line, strongly angulated outwards from about $\frac{1}{3}$ of the costa to $\frac{2}{3}$ of the dorsum and a narrow band of rusty brown on the termen. The hind-wings are ovate-triangular; brownish-black. In the female the fore-wings are more oblong with the costa less arched and the apex acute, dark yellowish-brown; there is a large blackish patch on the costa near the middle; a strongly angulated transverse line extends from the outer edge of this patch to the middle of the dorsum; beyond this line the entire wing has faint purplish reflections; there is a narrow blackish sub-terminal line double near the apex and a bright rusty-red band on the termen. The hind-wings, which have the apex rather pointed, are dark greyish-brown.

The perfect insect has been observed in February, and frequents open spaces on mountains, near the termination of the forest, at elevations of about 3,000 feet above the sea-level. It flies rapidly in the hottest sunshine, and is apparently a rare and local species.

SIMAETHIS SYMBOLAEA.

(*Simaethis symbolaea*, Meyr., Trans. N.Z. Inst., xx., 85.)

(Plate XL, fig. 21 ♂.)

This rather broad-winged species has occurred commonly on Arthur's Pass at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The antennae are black very strongly ringed with white. The fore-wings are bronzy-brown with violet-tinged white markings; there is an irregular basal patch followed by two very jagged irregular bands of scattered whitish scales; beyond this there is a clear white discal spot with a white bar above it on the costa and below it on the dorsum; a patch of whitish scales on the costa before the apex, along the termen from the apex almost to the tornus and on the dorsum before the tornus. The hind-wings are dark brown, paler towards the base; there is a fine line of scattered white scales from the tornus to the disc at $\frac{1}{3}$. The head and thorax are dark brown thickly speckled with violet-tinged white scales.

The perfect insect appears in January, and frequents veronias and other sub-alpine vegetation.

SIMAETHIS MINISTRA.

(*Simaethis ministra*, Meyr., Trans. N.Z. Inst., xliv., 121.)

(Plate XXXIII., fig. 30 ♀.)

This neat-looking little species was discovered on Mount Holdsworth at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are narrow oblong; dark slaty-grey with bright golden-bronze reflections; the basal half is irregularly strewn with bluish-white scales which tend to form wavy transverse lines; there are three, very wavy, broken transverse lines of bluish-white scales on the apical area; distinct white costal spots at $\frac{1}{2}$ and $\frac{3}{4}$ and several scattered silvery metallic scales in the disc at $\frac{1}{2}$ and on the termen near the middle. The hind-wings are pale bronzy-grey darker towards the apex "with an irregular white streak extending across the dorsal half of the wing from disc at $\frac{1}{2}$ nearly to tornus." (Meyrick). The cilia are grey with a white line and white tips. The antennae are not ringed with white.

The perfect insect appears in February, and frequents rough alpine herbage above the limit of forest.

SIMAETHIS MARMAREA.

(*Simaethis marmarea*, Meyr., Trans. N.Z. Inst., xx., 85.)

This species, which is extremely closely allied to *S. microlitha*, has occurred on the Mount Arthur Tableland at an elevation of 4,000 feet above the sea-level and at Lake Wakatipu at an altitude of 2,200 feet.

The expansion of the wings is nearly $\frac{1}{2}$ inch. Differs from *S. microlitha* in the hind-wings, which are more pointed and have the white streak reaching the tornus.

The perfect insect appears in December and January, and frequents mountains.

SIMAETHIS ANALOGA.

(*Simaethis analoga*, Meyr., Trans. N.Z. Inst., xlv., 122.)

(Plate XLVL, fig. 1 ♀.)

This little species was discovered by Mr. Meyrick, on the Mount Arthur Tableland, in January, 1886, at an altitude of 4,000 feet above the sea-level. It has since been taken in the same locality by Mr. Philpott.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are dark blackish-grey with very strong bronzy reflections and silvery-white markings; there are three clear white lines on the costa beyond $\frac{1}{2}$ continued across the wing as very broken suffused wavy lines, the outermost reaching the tornus and a cluster of shining silvery scales near the termen below the apex. The hind-wings are grey, darker towards the termen, with faint bronzy reflections; there is a white mark before the middle of the termen and sometimes a dot on the tornus. All the cilia are white mixed with black.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

SIMAETHIS MICROLITHA.

(*Simaethis microlitha*, Meyr., Trans. N.Z. Inst., xx., 84;

ibid., xlv., 122.)

(Plate XL, fig. 7 ♂.)

This very dark-looking little species has occurred on Arthur's Pass at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is barely $\frac{1}{2}$ inch. The antennae are very narrowly ringed with white. The fore-wings are narrow-oblong with the costa rather strongly arched, deep bronzy-black; the basal third is irregularly sprinkled with violet-tinted whitish scales; there are two short oblique white bars on the outer half of the costa; two in the disc beyond the middle; one on the dorsum before the tornus and four minute

silvery subterminal marks opposite the discal marks. The hind-wings are slightly paler than the fore-wings with a slender, regular well-marked white streak extending three-quarters across the wing to middle of termen and thence running partially interrupted near the termen almost to the tornus.

The perfect insect appears in January, and frequents veronicas and rank herbage on the mountain side.

SIMAETHIS ANTIGRAPHA.

(*Simaethis antigrapha*, Meyr., Trans. N.Z. Inst., xliii., 76.)

(Plate XXXIII, fig. 28 ♂.)

This pretty little species has occurred at Wellington.

The expansion of the wings is considerably over $\frac{1}{2}$ inch. The fore-wings, which are rather broad with the costa moderately arched, are very rich brownish-black; the basal third is thickly speckled with purplish-white, the speckling sometimes being partially divided into two or more bands; there is a clear transverse band of the ground colour near the middle of the wing containing a shining silvery discal spot; this is followed by a broad band of purplish white dots reaching from four-fifths of the costa to the tornus; there is another band of the ground colour with a few purplish-white scales close to the termen. The hind-wings are ovate triangular, dark brownish-black with a very faint subterminal series of whitish scales, stronger in the female.

The perfect insect appears in November and December, and flies actively in the late afternoon sunshine, often pausing to bask on flowers or leaves. It is sometimes locally abundant on the edges of scrub. Worn specimens are occasionally met with very early in the spring, and these have apparently hibernated.

SIMAETHIS ALBIFASCIATA.

(*Simaethis albifasciata*, Philp., Trans. N.Z. Inst., lv., 213.)

(Plate L., fig. 6 ♂, 7 ♀.)

This species was discovered by Mr. Philpott on the Mount Arthur Tableland, Nelson, at an elevation of about 4,000 feet above the sea-level. It has also occurred at Goulard Downs. In the North Island it has been taken on Mount Ruapehu.

The expansion of the wings of the male is almost $\frac{1}{2}$ inch; of the female about seven-sixteenths of an inch. The fore-wings of the male are broadly triangular; blackish-grey; there is a patch of whitish scales near the base; a broad band before middle; a blackish discal dot, partially encircled with silvery scales; a very ill-defined subterminal band of whitish scales and several silvery scales near apex. The hind-wings are blackish-grey, with a somewhat club-shaped white band from near tornus to beyond disc and a much smaller band below this. The female is much paler with narrower and more oblong wings; there is a broad, almost clear white, subterminal transverse band; the margin of the dark grey basal area has a strong projection near the middle and there is a pale greenish-grey band between this and the white subterminal band.

The perfect insect appears in December.

Described and figured from Mr. Philpott's specimens.

SIMAETHIS URBANA.

(*Simaethis urbana*, Clarke, Trans. N.Z. Inst. Inst., lvi., 420.)

(Plate LII, fig. 19 ♂.)

This very distinct little species was discovered by Mr. C. E. Clarke at Arthur's Pass.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are oblong, *brownish-straw-colour* with faint white transverse blotches on basal and apical thirds; a small black curved mark on costa beyond middle; a large black spot in disc below this; a similar spot in middle of dorsum; these markings are irregularly bordered with silver towards termen; a black mark on costa near apex, followed by a conspicuous silvery sub-terminal line, and a small black tornal mark; cilia greyish-white with faint blackish bars at apex and above tornus. The hind-wings are *uniform brownish-black*, darker towards termen; the cilia are white with a dark grey line. The antennae are black faintly ringed with white. The head is pale grey; the thorax brownish-straw-colour; the abdomen blackish barred with greyish-white.

The perfect insect appears in January.

Described and figured from specimen supplied by Mr. Clarke.

SIMAETHIS BARBIGERA.

(*Simaethis barbiger*, Meyr., Trans. N.Z. Inst., xlvii., 203.)

(Plate XL, fig. 13 ♀.)

This very distinct and interesting species was discovered by Mr. Philpott on Mount Cleughearn, Hunter Mountains. It has also occurred on the Hump Range and on Bold Peak, Lake Wakatipu, at elevations ranging from 3,000 to 4,000 feet above the sea-level.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are rather broad oblong with the apex rounded and the termen bowed and slightly oblique; *dark bronzy-greyish-brown* with several very irregular transverse lines formed of chains of white scales; *there is a conspicuous white discal dot beyond the middle and beyond this a very distinct transverse line, very strongly bowed outwards in the middle*; outside this line there are a few scattered white scales. The hind-wings are dull grey with one or two elongate patches of white scales near the middle of the termen.

Apparently variable in respect of the extent of the scattered white markings, especially on the terminal areas.

The perfect insect appears in December and January, and is abundant on the open mountain side.

I am indebted to Mr. Philpott for specimens.

SIMAETHIS NIVESCENS.

(*Simaethis nivescens*, Philp., Trans. N.Z. Inst., lvi., 397.)

(Plate LII, fig. 24 ♀.)

This species, which seems to be very closely allied to *Simaethis barbiger*, was discovered by Mr. Philpott on Mount Arthur, at an elevation of 4,500 feet above the sea-level.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are bronzy-black with very pale bluish-white markings; the basal third is very thinly and irregularly strewn with bluish-white scales; the ground colour persists on a broad median band, with the exception of a well-marked bluish-white discal spot; *there is a very strongly angulated transverse line with a small loop on the dorsum*; beyond this the wing is heavily sprinkled with bluish-white scales, except near the transverse line close to costa and dorsum; the extreme terminal area is clear of whitish scales. The hind-wings are very pale bronzy-brown, darker towards the termen; there are two irregular bands of whitish scales; the upper reaching from tornus towards disc at about $\frac{3}{4}$, the lower band being shorter and less defined. All the cilia are whitish with two bronzy-black lines.

The perfect insect appears in January and may be looked for amongst rough herbage on the mountain side.

Described and figured from a specimen submitted by Mr. Philpott.

SIMAETHIS TILLYARDI.

(*Simaethis tilyardi*, Philp., Trans. N.Z. Inst., lv., 666.)

(Plate LI, fig. 22 ♀.)

This very distinct species was discovered by Dr. Tillyard at Mount Cook, at an altitude of 2,500 feet above the sea-level.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. The fore-wings, *which have the apex strongly falcate*, are very pale whitish-grey, with blackish-grey markings; there is a cloudy transverse line near the base; another at about $\frac{1}{2}$ expanded into a cloudy spot in the middle; *a very large blotch composed of blackish streaks is situated in the disc before the tornus* and contains a few silvery-metallic scales; several small costal marks above this; the apical third is clouded with blackish-grey and *densely sprinkled with bluish-white scales*, except on a sinuate line, extending from the costa near the apex almost as far as the tornus. The hind-wings are very pale grey, darker towards the termen, *where there is a very dense sprinkling of bluish-white scales*; a very faint, broad, winding whitish line traverses the hind-wing from above middle to tornus. All the cilia are whitish with grey tips and grey basal line.

The perfect insect was taken in March.

Described and figured from the unique specimen kindly submitted by Mr. Philpott.

Genus 5.—CHOREUTIS, Hübner.

Labial palpi with second joint roughly tufted, terminal joint slender, pointed. Fore-wings with vein 7 to termen.

Chiefly American and Indo-Malayan, ranging into Australia and Europe.

Represented in New Zealand by one cosmopolitan species.

CHOREUTIS BJERKANDRELLA.

(*Choreutis bjerkanrella*, Thunb., Diss. Ent. i., 36, pl. iii., 23, 24; Meyr. Handbook, Brit. Lep., 706; Proc. Linn. Soc. N.S.W., 1880, 215.)

(Plate XXXIII, fig. 27.)

Although confined to very restricted spots this dark, silver-spotted, little insect has occurred in many localities both in the North Island and northern part of the South Island.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are broadly triangular with the apex somewhat rounded and the termen oblique; *dark bronzy-brown with strong golden reflections*; there are two irregular whitish transverse bands at about $\frac{1}{3}$ and $\frac{2}{3}$; *two dark blotches with gleaming silvery centres beyond the middle of the disc and one near the middle of the dorsum*; there are also several small silver spots on the costal area; the hind-wings are bronzy-grey with an elongate white blotch below the middle; the cilia of all the wings are dark grey with a white line.

This insect varies considerably in the depth of the colouring, extent of whitish markings, and number of silver spots.

The larva feeds on thistles (*Carduus*) and other *Compositae*. It is green, yellower laterally with black spots and a brown head.

The perfect insect appears from January till March, and is locally abundant in dry stony places, such as river beds or roadsides. It is strictly diurnal in its habits, flying freely in the hottest sunshine. The species is practically cosmopolitan, though rarer in Europe than elsewhere.

Genus 6.—PANTOSPERMA, Meyr.

Antennae almost as long as fore-wings. Labial palpi with appressed scales, slightly rough anteriorly, terminal joint as long as second, pointed. Fore-wings with veins 7 and 8 stalked, 7 to termen. Hind-wings lanceolate.

An endemic genus represented by one species.

PANTOSPERMA HOLOCHALCA.

(*Pantosperma holochalca*, Meyr., Trans. N.Z. Inst., xx., 89.)
(Plate XXXIII., fig. 14 ♀.)

This very plain-looking species has occurred at Tokaanu, Makotuku and Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical with the apex acute; *brownish-ochreous with bronzy reflections*; there are a few greyish-black scales irregularly scattered over the wing but no distinct markings. The hind-wings are dark grey with faint purplish-bronzy reflections.

The perfect insect appears from January till March, stragglers being sometimes met with until the end of April. It frequents rushes (*Juncus*), where it is often locally abundant. It flies rapidly in the hottest sunshine.

Genus 7.—GLYPHIPTERYX, Hübner.

Labial palpi with second joint loosely or roughly scaled in whorls, sometimes tufted, terminal joint compressed, roughened, pointed. Fore-wings with vein 7 to termen, 7 and 8 sometimes stalked. (Plate H., figs. 24, 25, 26 neurulation and head of *Glyphipteryx erastis*.)

This is a large cosmopolitan genus, especially well represented in Australia and New Zealand, but very scantily in Europe, Africa, and North America. Its members are distinguished by the smooth head, the broad forehead, the short thickened labial palpi and the slender antennae being shorter than the body. Many of the species are further distinguished by an indentation in the termen below the apex, but species which cannot otherwise be separated generically have the termen entire. Other species have the anterior wings adorned with silvery markings, or silvery and white markings. All the species are true day-fliers, delighting to sport in the hottest sunshine; they are fond of sitting on flowers, and when otherwise at rest, they have the peculiar habit of alternately raising the wings slightly and then depressing them just as if they were fanning themselves.*

The larvae of the New Zealand species, of which the life histories are known, feed on the pith inside the stems of rushes or sedges, the insects remaining in this condition during the autumn and winter, the pupa state being assumed early in the spring.

No less than twenty-nine species of this interesting genus are found in New Zealand, and although of small

size, many of them must be ranked amongst the handsomest of our native insects. Of these species five are restricted to the North Island, fourteen to the South Island and ten occur in both islands.

GLYPHIPTERYX CIONOPHORA.

(*Circica cionophora*, Meyr., Trans. N.Z. Inst., xx., 88.)
(Plate XXXIII., fig. 10 ♂.)

This rather inconspicuous species has occurred at Wellington, Christchurch, Dunedin and at Ida Valley, Central Otago.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are *elongate lanceolate* with the apex very sharply pointed in the female; whitish-ochreous; there is a straight, bronzy longitudinal stripe from the base to the apex near the costa and a cloudy ochreous streak along the fold. The hind-wings are grey, paler in the female.

The perfect insect appears in February, March and April, frequenting open grassy country. According to Mr. Meyrick it is common on the Lyttelton Hills near Christchurch, and I have met with it in abundance on the grassy cliffs around Sinclair Head, near Wellington.

GLYPHIPTERYX AENEAE.

(*Glyphipteryx aeneae*, Philp., Trans. N.Z. Inst., xlix., 244.)
(Plate XXXIV., fig. 7 ♀.)

This handsome species was discovered by Mr. Philpott on the Hump Ridge, Southland. It has also occurred on Mount Burns, Hunter Mountains, at altitudes between 3,000 and 3,500 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are *extremely-pointed* without any apical lobe; *shining golden or brassy*; there is a narrow purplish band along the costal edge and a number of white and iridescent scales towards the apex, the extreme apex being blackish. The hind-wings are grey, with purplish reflections.

The perfect insect appears from December till February, and is found in open grassy places on the mountain side. It is a rare species, apparently confined to the extreme south.

Described and figured from a specimen in Mr. Philpott's collection.

GLYPHIPTERYX NESTOBELA.

(*Circica nestobela*, Meyr., Trans. N.Z. Inst., xx., 89.)
(Plate XLVIII., fig. 22 ♂; 37 ♀.)

This species was discovered by Mr. Meyrick on Arthur's Pass at an altitude of from 3,000 to 4,000 feet above the sea-level.

The expansion of the wings of the male is $\frac{1}{2}$ inch, of the female $\frac{1}{2}$ inch. The fore-wings of the male are rather broad, with the apex sharply pointed; *dull bronzy-brownish-grey*, narrowly margined with cream colour along outer part of costa; the cilia are cream colour on costa and greyish-white on termen and dorsum. The hind-wings are grey with paler cilia. In the female the wings are much abbreviated and quite incapable of flight, pale cream colour, with about ten transverse rows of blackish scales, paler towards base. The hind-wings are cream colour.

The perfect insect appears in January.

*Stainton, Natural History of the Tineina, xi., 230.

I am much indebted to Mr. C. E. Clarke for the loan of two very perfect specimens of this rare and interesting species. These formed the basis for the descriptions and figures given in this work.

GLYPHIPTERYX RUGATA.

(*Glyphipteryx rugata*, Meyr., Trans. N.Z. Inst., xlvii., 203.)

(Plate XXXIII., fig. 13 ♀.)

This odd-looking, short-winged little insect was discovered by Mr. Philpott at Tisbury near Invercargill. It has also occurred at Dunedin and Alexandra.

The expansion of the wings is about five-sixteenths of an inch. The fore-wings, which are rather broad, short and *acutely pointed, are grey with silvery-bronze reflections; there are numerous distinct blackish bars on the costa; a large curved black mark on the dorsum at about $\frac{1}{3}$; two or three indistinct blackish transverse bands across the apical third of the wing and a distinct black spot at the apex.* The hind-wings are pale grey. In the female, which is the only sex at present known, the body and legs are very stout so that the small wings can hardly suffice to support the insect in the air.

The perfect insect appears from January till April, and frequents forests. In cultivated places it may be found on hedges of *Cupressus macrocarpa*.

Described and figured from a specimen in Mr. Philpott's collection.

GLYPHIPTERYX ATARACTA.

(*Phryganostola ataracta*, Meyr., Trans. N.Z. Inst., xx., 88.)

(Plate XLVI., fig. 7 ♂.)

This pale-coloured, narrow-winged species was discovered by Mr. Meyrick on Mount Arthur in January, 1886, at an altitude of 4,600 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical, pale brownish-ochreous with the principal veins dotted with brown scales. The hind-wings are whitish-ochreous.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

GLYPHIPTERYX ACHLYOESSA.

(*Phryganostola achlyoessa*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 252.)

(Plate XXXIII., fig. 12 ♂, 11 ♀.)

This delicate-looking species is common and generally distributed throughout the country.

The expansion of the wings of the male is a little more than $\frac{1}{2}$ inch, of the female about $\frac{3}{4}$ inch. The fore-wings have the apex rounded in the male and the termen very oblique with a slight notch below the apex; in the female the apex is produced into a distinct lobe; *pale greyish-ochreous in both sexes, finely speckled with darker grey; there are five obscure, darker-edged, whitish bars on the costa before the apex and several minute elongate black marks in the disc; the termen is clouded with greyish-brown and narrowly edged with black.* The hind-wings are rather dark grey, darkest towards the apex.

There is slight variation in the general depth of the colouring, and the males are usually paler and less tinged with ochreous than the females.

The perfect insect appears towards the middle of October and may be met with during November and De-

cember. It frequents meadows and other open spaces and is most abundant amongst the introduced grasses to which it appears to be especially attached. When disturbed it only flies a short distance, alighting on a neighbouring grass stem, often to be again disturbed by our progress through the grass. Its pale grey colouring gives it a delightfully cool appearance when on the wing, or when quietly resting, or walking on a grass stem.

GLYPHIPTERYX BACTRIAS.

(*Glyphipteryx bactrias*, Meyr., Trans. N.Z. Inst., xliii., 67.)

(Plate XXXIII., fig. 9 ♂.)

This very distinct and interesting species was discovered at Invercargill by Mr. Philpott. It has also occurred at Bottle Lake, near Christchurch.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are elongate-oval *with the apex produced into a long, slender acute point and the termen very obliquely rounded; bronzy-ochreous-brown; there is a conspicuous white longitudinal streak from the base to beneath the apex, a leaden-metallic spot on the termen below the apex and a series of small blackish-brown marks across the pointed apex.* The hind-wings are blackish-grey.

There is slight variation in the general depth of the colouring.

The perfect insect appears from October till January and frequents marshy localities near the seashore. Mr. Meyrick observes that the form of the fore-wings is unique in the genus.

Described and figured from specimens kindly given to me by Mr. Philpott.

GLYPHIPTERYX METASTICTA.

(*Glyphipteryx metasticta*, Meyr., Trans. N.Z. Inst., xxxix., 119.)

(Plate XXXIII., fig. 15 ♂.)

This rather obscurely-marked species has occurred commonly at New River near Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the costa slightly arched, the apex round-pointed and the termen obliquely rounded, veins 7 and 8 stalked; rather dull bronzy-brown, in the female dark brown with a whitish streak along the dorsum; there is a conspicuous black dot in the disc beyond and below the middle; a fainter dot above the tornus and several rows of scattered black scales near the apex; the cilia are white with a fine blackish basal line. The hind-wings are grey, thickly dotted with blackish grey, darker in the female; the cilia are blackish-grey.

The perfect insect appears from October till February, and is found in swampy places near sand-hills on the sea coast.

Described and figured from a specimen in Mr. Philpott's collection.

GLYPHIPTERYX AULGRAMMA.

(*Glyphipteryx aulogramma*, Meyr., Trans. N.Z. Inst., xxxix., 120.)

(Plate XXXIII., fig. 16 ♂, 17 ♀.)

This species was discovered by Mr. Philpott at Invercargill. It has also occurred at Christchurch and at Ida Valley, Central Otago.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings of the male are rather elongate *with the apex pointed*

and the termen very oblique; pale shining ochreous; there is an oblique pale silvery transverse line from the costa at $\frac{1}{4}$ to the dorsum near the tornus, a second line from the costa joins this, a third wavy line extends from the costa at $\frac{3}{4}$ to the termen just above the tornus, a Y-shaped marking is situated near the apex; there is a terminal series of blackish dots and the silvery stripes are in some cases faintly edged with blackish scales. The hind-wings are grey. In the female the fore-wings are uniform greyish-ochreous often without distinct markings and the hind-wings are dark grey.

The perfect insect appears in October and November. It is found amongst rough herbage near the sea coast.

Described and figured from specimens kindly given to me by Mr. Philpott.

GLYPHIPTERYX TRANSVERSELLA.

(*Argyresthia transversella*, Walk., Brit. Mus. Cat. xxx. 849; *Glyphipteryx transversella*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 246; ? *morangella*, Feld., Reis. Nov. pl. cxl. 39; *Glyphipteryx codonias*, Meyr., Trans. N.Z. Inst. xli. 15.)

(Plate XXXIII, fig. 20 ♀.)

This very beautiful species has occurred in the North Island on the Waitakere Ranges near Auckland, at Waimarino, Mount Egmont, Napier, and Porirua. In the South Island it has been found at Nelson, Christchurch, Lake Wakatipu, Waihopai Bush and Seaward Moss near Invercargill.

The expansion of the wings is from $\frac{1}{2}$ to $\frac{3}{4}$ inch. The fore-wings are rather broad with the apex acute and the termen oblique; brilliant metallic-golden-ochreous, clouded with very rich coppery-red towards the base; there is an obscure, paler, central, longitudinal streak from the base to beyond the middle; four oblique silvery-iridescent metallic bars on the outer half of the costa; two broad bars on the termen and a curved bar from costa to termen just before the apex; there is a curved black stripe and tuft of black scales at the apex. The hind-wings are blackish-grey, darker towards the apex.

The perfect insect appears in January, and frequents damp, grassy openings in the forest. It flies actively in the afternoon sunshine.

Glyphipteryx codonias, Meyr. is stated to differ in the absence of the pale longitudinal streak, the silvery streaks differently formed, the second angulated and the third shorter than fourth.

GLYPHIPTERYX OCTONARIA.

(*Glyphipteryx octonaria*, Philp., Trans. N.Z. Inst., lv., 210.)

(Plate L., fig. 3 ♂.)

This species was discovered by Mr. Philpott on the Gould Down near Nelson. It has also been taken on the Tableland of Mount Arthur, at an altitude of 4,500 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rather broad with the costa strongly arched before the apex and the termen sinuate; bright greenish bronze with black-edged markings; there are seven oblique silvery bands on the costa, those near the apex being almost white, shorter and much broader than the others; a dull silvery blotch below apex, another before tornus and two others nearer the disc; the cilia are white barred with grey towards apex and tornus. The hind-wings and cilia are dark brown.

The perfect insect appears in February.

Described and figured from a specimen kindly lent by Mr. Philpott.

GLYPHIPTERYX ASTRAPAEA.

(*Glyphipteryx astrapaea*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 245.)

A single specimen of this species was captured by Mr. Meyrick at Cambridge about the year 1880.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are moderately broad, termen sinuate below apex; brilliant metallic coppery-bronze, with violet-silvery metallic obscurely dark-margined markings; a short oblique streak from costa before middle; a rather irregular outwardly-curved fascia from beyond middle of costa to tornus; a rather short oblique streak from $\frac{1}{4}$ of costa, opposite extremity of which is a triangular spot on termen below middle; two small spots on costa before apex, second produced as a curved streak to termen below apex, cilia whitish towards apex, blackish-fuscos towards tornus, with a black apical hook, and intersected by a strong black line, obliterated at tornus and where a white black-margined indentation meets the sub-apical streak. Hind-wings and cilia blackish-fuscos.

This species is stated to be very similar to *Glyphipteryx transversella* but distinguished by the total absence of the longitudinal streak from base and by the complete fascia beyond middle.

The perfect insect appears in January and may be looked for in grassy swamps in hot sunny weather.

I am unacquainted with this species. The above is taken from the original description.

GLYPHIPTERYX AERIFERA.

(*Glyphipteryx aerifera*, Meyr., Exot. Micr., l. 57; Trans. N.Z. Inst., xlv. 28.)

(Plate XXXIII, fig. 22 ♂.)

This rather inconspicuous species was discovered on the slopes of Mount Ruapehu, at an altitude of about 4,500 feet.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings have the costa slightly arched, the apex acute, and the termen obliquely-rounded; pale metallic bronze slightly darker towards the termen; there are five oblique silvery-metallic bars on the outer half of the costa and three on the termen, none meeting; except the first costal bar, which is indistinct, all these markings are more or less irregularly margined with black. The hind-wings are grey.

The perfect insect appears in January, and is found in open glades, amongst the stunted sub-alpine scrub, on the upper edge of the forest region on Mount Ruapehu. It flies actively in hot sunshine.

GLYPHIPTERYX OXYMACHAERA.

(*Phryganostola oxymachaera*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 251.)

(Plate XXXIII, figs. 18, 19 ♀ varieties.)

This very variable species has occurred at Auckland, Waimarino, Mount Egmont, Wellington, Christchurch, Castle Hill, Ida Valley (Central Otago), Lake Wakatipu and Invercargill.

The expansion of the wings varies from about $\frac{3}{4}$ to seven-sixteenths of an inch. The fore-wings are narrow with the termen very oblique and the apical lobe distinct; dull brown, sometimes clouded with white near the costa, with dark-edged white markings; there is a broad curved longitudinal streak along the dorsum reaching beyond the middle of the wing; a series of rather indistinct costal streaks; a rather short oblique tornal streak terminating in a silvery spot and another small metallic mark near the termen. The hind-wings are brownish-grey.

There is considerable variation in the intensity of the ground colouring. Some specimens are quite brown with distinct costal streaks; others have a few faint bluish dots on the apical portions of the wing.

The perfect insect appears from November till March, and frequents dry grassy places, where it is sometimes fairly common.

GLYPHIPTERYX CALLIACTIS.

(*Glyphipteryx calliactis*, Meyr., Trans. N.Z. Inst., xlii. 112.)

(Plate XXXIV., fig. 12 ♂, 13 ♀; Plate III., fig. 35 larva.)

This large and very handsome species has occurred at Days Bay, Silverstream, and Kaitoke near Wellington.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are elongate-triangular with the apical lobe well-developed and the termen strongly bowed and very oblique; black with bronzy reflections; the male has several slender metallic blue stripes on the costa from about $\frac{1}{4}$ to $\frac{3}{4}$ and two short crescentic white markings before the apex; there is a subterminal series of elongate dull metallic-green spots and a fine metallic-green stripe on the dorsum just before the tornus. In the female the markings are much more numerous and distinct; there are seven oblique white costal streaks, tinged with vivid metallic blue or purple towards the disc; three broad curved white bars on the dorsum—the two outermost tinged with vivid metallic purple towards the disc, and two metallic purple spots near the termen. In both sexes the hind-wings are grey becoming almost black at the apex.

There is slight variation in the size and intensity of the markings in both sexes, and some male specimens have faint traces of the conspicuous white dorsal markings of the female.

The larva lives inside the flower-stems of sedge (*Gahnia setifolia*), from November till September, feeding on the soft inner pith. Its length when full-grown is slightly over $\frac{1}{2}$ inch. The head is very small, brown and shining; the rest of the body soft, very stout, suddenly tapering towards each extremity; bright yellowish-ochreous; there is a brown horny plate on the second segment; the posterior edge of the twelfth and the whole of the anal segment are horny and blackish-brown, the anal segment being furnished with four rather prominent tubercles; the legs and prolegs are small.

The pupa is enclosed in a thin silken cocoon within the flower-stem of the sedge, and is usually placed near a joint. The larva drives a tunnel almost through the wall of the stem, the outermost skin alone remaining intact so that its dwelling place is not revealed from the exterior. This provides a safe means of exit for the future moth.

The perfect insect appears in September, October and November, specimens bred from flower-stems kept indoors emerging fully a month earlier. It flies actively in hot sunshine, amongst sedges in beech forests.

GLYPHIPTERYX IOCHEAERA.

(*Glyphipteryx iocheaera*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 243.)

(Plate XXXIV., fig. 18 ♀; Plate III., fig. 22 larva; 23 pupa.)

This rather dull-looking species is apparently common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are rather elongate, the apex with a distinct lobe and the tornus rounded very dull greenish-bronze with black-edged dusky-white markings; there is a very oblique stripe on the costa beyond the middle, five oblique stripes near the apex and two on the termen; the apical lobe is black with a tuft of black cilia above and below it. The hind-wings are dark grey with bronzy reflections.

The larva lives in the stems of the common rush (*Juncus*), during the autumn and winter, feeding on the pith amongst which it drives numerous galleries. These communicate with the exterior by round openings through the green outer stem of the rush; but, prior to the exit of the perfect insect, the openings are covered with a thin pellicle evidently left by the larva as a protection. The termination of the burrow is, however, visible from the outside as a round brown spot on the stem of the rush.

The length of the larva when full-grown is about $\frac{1}{4}$ inch; stout with minute legs and prolegs. The head is blackish-brown and shining, the second segment has a large horny blackish dorsal plate, the other segments are pale green, darker beneath, each has a pale brownish dorsal mark; there is an interrupted blackish dorsal line on the anterior portion of the larva, the last segment is blackish-brown and horny, there are a few short isolated bristles.

The pupa is very elongate, pale ochreous-brown; the anterior wing-case is dull silvery-white, the posterior wing-case and abdomen are pale green, the cremaster is rounded and furnished with several black bristles, the eyes are black and very conspicuous.

The perfect insect appears in November and December. It delights in hot sunshine and is occasionally found swarming amongst rushes, but the best specimens are obtained by rearing them from the stems containing the larvae.

GLYPHIPTERYX LEPTOSEMA.

(*Glyphipteryx leptosema*, Meyr., Trans. N.Z. Inst., xx. 87; xliii., 75.)

(Plate XXXIV., fig. 9 ♂.)

This very distinct little species has occurred at Auckland, Waimarino, Kaitoke near Wellington, and at the Bluff.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-triangular with a distinct apical lobe and oblique rounded termen; bronzy-black; there is a small white mark on the dorsum near the base; two very oblique fine whitish bars

on the costa before the middle; two strongly elbowed fine transverse lines beyond the middle, the first connected with a very large triangular white patch on the dorsum; both bands are violet-silvery-metallic near the disc; there are three white marks on the costa near the apex, a black spot in the apical lobe and an interrupted terminal violet-silvery streak. The hind-wings are blackish-grey.

The larva of this insect tunnels the flower-stems of sedge (*Gahnia setifolia*), but does not live in the central pith, which is very frequently tenanted by the larger larva of *Glyphipteryx calliactis*. The length of the present larva is about $\frac{1}{4}$ inch; pale green, with a very broad, indefinite pinkish dorsal band; the head is pale brown and shining and the second and anal segments are horny and pale brown; there are a few very fine bristles. The pupa state is spent within one of the burrows.

The perfect insect appears in November, but is seldom observed and specimens may be best obtained by rearing the larva. *Tinea margaritis* is a very striking mimic of this interesting species.

GLYPHIPTERYX BRACHYDELTA.

(*Glyphipteryx brachydelta*, Meyr., Trans. N.Z. Inst., xlviii., 418.)
(Plate XXXVIII., fig. 12 ♂.)

This rather dull-looking little species has occurred plentifully at Karori near Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are dull blackish-grey; there are six black-edged white bars on the outer $\frac{2}{3}$ of the costa, the markings near the base being very indistinct; a large oblique somewhat triangular white mark near the middle of the dorsum and two irregular rows of small black-edged white marks on the termen; there is a very pronounced apical lobe and the cilia are grey-tipped with white. The hind-wings and cilia are blackish-grey.

This species may be recognised by its small size and broad triangular white dorsal spot, which is *not* produced as a fine curved transverse line across disc.

The perfect insect appears in March, and may be taken by sweeping amongst tall dried-up grass in hot sunshine.

GLYPHIPTERYX ASTERONOTA.

(*Glyphipteryx asteronota*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 240; ? *tungella*, Feld., Reis. Nov. pl. exl., 40.)
(Plate XXXIV., fig. 11 ♂.)

This species has occurred at Auckland and Wellington. It has also been reported from Whangarei and Napier.

The expansion of the wings varies from slightly under to considerably over $\frac{1}{2}$ inch. The fore-wings, which have the apical lobe strongly developed, are greyish-black, becoming dull greyish-ochreous towards the base; there are six oblique whitish bars on the costa and two very large trapezoidal cream-coloured patches on the dorsum; the two central costal bars are prolonged towards the dorsum as irregular leaden metallic markings, and there are also leaden metallic markings near the tornus and on each side of the apical lobe; the middle of the apical lobe is black and the edges of all the wing-markings are more or less outlined in black; the cilia are white with a fine black line and conspicuous black apical tuft. The hind-wings are greyish-black with blackish cilia.

This species varies considerably in the depth of the ground colour which in some specimens becomes almost wholly greyish-ochreous. The cream-coloured patches on the dorsum are also occasionally very indistinct. The absence of a black tornal patch with violet-silvery spots serves to distinguish this species from some of its closest allies.

The perfect insect appears from October till January, and frequents sunny glades in open scrub.

GLYPHIPTERYX DICHORDA.

(*Glyphipteryx dichorda*, Meyr., Trans. N.Z. Inst., xliiii., 76;
Glyph. plagigera, Philp., ib. xlviii., 423.)

This species has occurred at Whangarei, Wellington and Bluff.

The expansion of the wings is about $\frac{3}{4}$ inch. It very closely resembles some of the paler varieties of *G. asteronota*. It is, however, stated to be distinguished by the following characters: (1.) the palpi which are not rough-haired beneath; (2.) the narrower first dorsal spot; (3.) the metallic line from apex of first costal streak to apex of second dorsal spot; (4.) the metallic streak (not two dots) along lower part of termen.

The perfect insect appears from October till December, flying freely in the late afternoon sunshine amongst open scrub.

GLYPHIPTERYX SCINTILLA.

(*Glyphipteryx scintilla*, Clarke, Trans. N.Z. Inst., lvi., 420.)
(Plate LII., fig. 17 ♂.)

This brilliant little species was discovered by Mr. C. E. Clarke, on Flat Mount, Hunter Mountains, near Lake Manapouri, at an altitude of about 4,000 feet.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are bronzy-black with strong golden-bronze reflections, especially towards apex; an oblique whitish bar on costa at $\frac{1}{2}$; a silver-white oblique bar at $\frac{1}{2}$ almost meeting a whitish bar from dorsum at $\frac{1}{2}$; these two markings are joined in disc by a violet-silver metallic spot; on costa, between the second bar and apex, there are four silvery-white bars; two violet silvery metallic spots on termen, often confluent; two similar spots in disc; a very conspicuous black apical lobe with a minute silvery mark immediately below it; the cilia are bronzy-black with whitish bars against each of the silvery markings on the wing. The hind-wings are grey with blackish cilia. The head, body, antennae and legs are dull bronzy-black.

This species somewhat resembles *Glyphipteryx asteronota* and *dichorda*, but differs from both in the absence of the conspicuous white bars on the basal half of dorsum.

The perfect insect appears in January.

Described and figured from specimen kindly submitted by Mr. Clarke.

GLYPHIPTERYX EUASTERA.

(*Glyphipteryx euastera*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 236.)

(Plate XXXIV., fig. 21 ♂.)

This very beautiful little insect was discovered by Mr. Meyrick on the Lyttelton Hills, near Christchurch.

The expansion of the wings is five-sixteenths of an inch. The fore-wings, which have the apical lobe very fully developed, are black on the basal third, heavily sprinkled with white scales; the discal third, except on costa, is deep rich orange-yellow, also

the margins of the apical third; the centre of the apical third is black very heavily sprinkled with white scales; a broad oblique white bar on costa at $\frac{1}{2}$, steely-metallic-blue in disc; a broad, almost straight, white band from middle of costa to beyond middle of dorsum, steely-metallic-blue in disc; another strongly bent, narrower band beyond this, almost entirely steely-metallic-blue; three short curved white bars on apical third of costa; apical lobe yellowish, speckled with black and white; cilia yellowish with black line, tips white. The hind-wings are grey speckled with blackish-grey; cilia grey.

Easily recognised by the orange-yellow ground colour of the discal area; heavy sprinkling of white scales on basal and apical areas, and absence of black tornal patch.

The perfect insect appears from October till January, and may be looked for in dry grassy places.

Described and figured from specimens kindly given to me by Mr. S. Lindsay.

GLYPHIPTERYX ACROTHECTA.

(*Glyphipteryx acrothecta*, Meyr., Proc. Linn. Soc., N.S.W., 1880, 244.)

(Plate XXXIV., fig. 5 ♀.)

This rather dull-looking species has occurred on the Lyttelton Hills near Christchurch, at Mount Grey, and at Castle Hill, West Coast Road.

The expansion of the wings is about five-sixteenths of an inch. The fore-wings are rather elongate without any definite apical lobe; pale grey tinged with ochreous towards the base; there are six oblique bars on the outer two-thirds of the costa, the first two very indistinct, the remaining four white, more or less margined with darker grey; there is an obscure silvery-grey patch near the termen. The hind-wings are very pale ochreous-brown.

The perfect insect appears in January, and frequents open grassy hillsides, but seems to be very local.

Described and figured from specimens in the Fereday collection.

GLYPHIPTERYX NEPHOPTERA.

(*Glyphipteryx nephoptera*, Meyr., Trans. N.Z. Inst., xx. 87.)

(Plate XXXIV., fig. 19 ♀.)

This very elegant species has occurred at Mount Grey, Christchurch, and at Greenhills near Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings, which have a very prominent apical lobe and rounded termen, are silvery-grey very faintly clouded with pale brown on the disc and termen; there are three dull white bars on the costa at about $\frac{1}{4}$, $\frac{1}{2}$ and beyond $\frac{1}{2}$, and three clear white wedged shaped bars before the apex; all these markings are margined with blackish-grey towards the base; there are several faint silvery marks on the terminal third of the wing and a conspicuous black dot in the centre of the apical lobe. The hind-wings are dull grey.

The perfect insect appears in February and March, and is found on grassy hillsides and in forest near the seashore. It is allied to *Glyphipteryx acrothecta*, but broader-winged with the markings brighter and more clearly defined.

Described and figured from a specimen in Mr. Philpott's collection.

GLYPHIPTERYX ZELOTA.

(*Glyphipteryx zelota*, Meyr., Trans. N.Z. Inst., xx. 86.)

(Plate XXXIV., fig. 10 ♂.)

In the North Island this very handsome species has occurred at Kaeo, Whangarei, Waitakere Ranges, Auckland and Wellington. In the South Island it has been found in the Nelson District, and is common on Mount Peel at elevations between 4,000 and 5,000 feet above the sea-level.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with a large lobe at the apex and the tornus rounded; deep bronzy-brown near the base becoming bronzy-green towards the termen; there is a broad white band on the dorsum at about $\frac{1}{4}$; a narrower oblique band on the costa at $\frac{1}{2}$; two narrow, curved, bluish-silvery bands from costa to dorsum beyond the middle; two small dull metallic marks on the costa before the apex followed by two curved white marks; a bluish-metallic spot in the apical lobe and a large oblong black spot at the tornus containing six gleaming purplish-silver metallic spots. The hind-wings are dark greyish-brown.

There is slight variation in the general depth of the ground colour, which ranges from very rich bronzy-brown to rather paler bronzy-grey. Generally speaking, North Island specimens are darker and more strongly-marked than those from the South Island.

The perfect insect appears from the end of December until the middle of February, flying freely in the hottest sunshine. It is a very local species and, in lowland localities, is usually met with amongst forest.

GLYPHIPTERYX ACRONOMA.

(*Glyphipteryx acronoma*, Meyr., Trans. N.Z. Inst., xx. 86.)

(Plate XLVI., fig. 14 ♀.)

This fine species, which is very closely allied to *Glyphipteryx zelota*, has occurred at Waimarino in the North Island and on Mount Arthur and on the Knife and Steel, Fiord County, in the South Island, at an altitude of about 4,000 feet above the sea-level.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings, which have a very distinct apical lobe, are bronzy-black more or less clouded with dull bronzy-ochreous beyond the middle; there is an indistinct white patch on the dorsum at the base; a large white oblique blotch on the costa at $\frac{1}{4}$, broadest in the middle, pointed at its apex and reaching halfway across the wing; a slender white, slightly curved band from the middle of the costa to beyond the middle of the dorsum; a silvery-blue metallic band beyond this, white on the costa and dorsum; three short silvery-blue streaks on the costa between the second band and the apex, the last margining a round black apical spot and a sub-triangular black tornal blotch containing four violet-silver-metallic spots; the cilia are grey. The hind-wings are dark grey.

The perfect insect appears at the end of December and in January, and frequents open country on the mountain side.

Described from specimens kindly given to me by Mr. Philpott.

GLYPHIPTERYX ERASTIS.

(Glyphipteryx erastis, Meyr., Trans. N.Z. Inst., xliii., 76.)

(Plate XXXIV., fig. 20 ♀.)

This exquisite little insect is common in the neighbourhood of Wellington. It has also occurred at Waimarino, Christchurch, Castle Hill and Lake Wakatipu.

The expansion of the wings is five-sixteenths of an inch. The fore-wings have a prominent lobe at the apex, the termen oblique and the tornus strongly rounded; *golden-ochreous clouded with grey towards the base*; there is an irregular whitish patch near the base; a wedge-shaped cream-coloured mark on the costa at about $\frac{1}{3}$; two broad silvery-white transverse bands near the middle, *followed by an oblong patch of dark grey and white scales*; a small black spot and a violet-silvery-metallic dot are situated in the apical lobe; *a large oblong black spot at the tornus, containing three violet-silvery-metallic dots*. The hind-wings are grey, with bronzy reflections.

There is considerable variation in the depth of the ground colouring, and in the intensity of the markings.

The perfect insect appears during hot sunny days from November till March, but is commonest in December and January. It usually frequents open places near scrub, or forest, and is often found in gardens, not infrequently entering houses, where it may be seen on the window panes. It flies most freely in the late afternoon, when it is sometimes observed pairing.

GLYPHIPTERYX TRISELENA.

(Glyphipteryx triseleena, Meyr., Proc. Linn. Soc. N.S.W., 1880, 234; *ibid.*, 1882, 188.)

(Plate XXXIV., fig. 6 ♀.)

This very clearly-marked, fragile-looking species has occurred at Christchurch, Dunedin, Lake Wakatipu and at Wallacetown near Invercargill.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are rather elongate with the apex moderately pointed and the termen obliquely-rounded; *pale golden-orange-yellow; there are three silvery-metallic stripes crossing the wing, the first at $\frac{1}{4}$, the second before the middle and the third slightly before $\frac{3}{4}$; beyond the third stripe there is a large white patch traversed by several rows of minute, dark grey dots*; an elongate, bent black band is situated at the tornus, containing four silvery-metallic spots and a small patch of the golden-yellow ground colour at the apex, traversed by a fine silvery-metallic band. The hind-wings are very pale greyish-white.

The perfect insect appears in December and January, and is found in open grassy places. It is extremely local.

Described and figured from a specimen kindly given to me by Mr. Philpott.

GLYPHIPTERYX BARBATA.

(Glyphipteryx barbata, Philp. Trans. N.Z. Inst. 1, 130.)

(Plate XXXVIII., fig. 13 ♂.)

This large, robust-looking species was discovered by Mr. C. E. Clarke at Waitati near Dunedin.

The expansion of the wings is $\frac{3}{4}$ inch. *The palpi are thickly clothed with long greyish-white hairs*. The fore-wings are elliptical with the apex very pointed, terminating in a small, but very distinct lobe. All the wings are deep ochreous-grey. The fore-wings have a broad suffused longitudinal silvery-white streak from the base to the termen below the apex; there are three blackish bars on the costa close to the apex, with whitish

interspaces. The cilia are greyish-white, tipped with blackish near the apex of the fore-wings; there is a ring of dark cilia around the apical lobe, and a distinct projecting tuft over the apex.

The perfect insect appears from November till January, and frequents hills at about 1,000 feet above sea-level. It is attached to tussocks, but is a very local species.

Genus 8.—CHARIXENA, Meyr.

Head with appressed scales; ocelli absent; tongue absent. Antennae $\frac{1}{2}$, in ♂ moderately ciliated, joints about 26 in number, rather elongate, with slightly expanded whorls of scales, basal half of stalk thickened with rough scales, more strongly towards base, basal joint short, stout, thickened with dense scales projecting on anterior edge. Labial palpi extremely small, rudimentary. Maxillary palpi absent. Posterior tibiae with appressed scales. Fore-wings with vein 1b furcate, 2 from towards angle, 3 from angle, 4 and 5 approximated at base, 7 to termen, 8 and 9 approximated at base, 11 from middle. Hind-wings somewhat under 1, elongate-ovate, cilia $\frac{3}{4}$; 3 and 4 somewhat approximated towards base, 5 tolerably parallel, 6 and 7 somewhat approximated towards base, transverse vein rather strongly oblique.

A very remarkable genus. On the neural and antennal characters I can only regard it as belonging to this sub-family, but it differs widely from all the other New Zealand genera in the minute labial palpi, which are only perceived with difficulty. It has, however, many points of resemblance to the Australian genus *Cebysa*, in which the labial palpi are very short, and there seems to be a true relationship. (Meyrick.)

Only one species is known at present.

CHARIXENA IRIDOKA.

(Philpottia iridoka, Meyr., Trans. N.Z. Inst., xlviii., 417.)

(Plate XXXVII., fig. 16 ♂.)

This very handsome species was discovered by Mr. Philpott on Mount Burns, Hunter Mountains, on December 29, 1914, at an elevation of about 3,200 feet above the sea-level. Since that time mined leaves of *Astelia Cockaynei*, the work of its larva, have been observed by Mr. Morris N. Watt on Mounts Egmont and Ruapehu in the North Island; and in the South Island by Mr. Philpott on Mount Arthur, by Mr. C. E. Clarke on many mountains in Otago, and by Mr. Fenwick on the track between Lake Te Anau and Milford Sound.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. *The antennae are rather short, very heavily scaled*. The fore-wings are rather broad with the termen obliquely rounded; *glistening bronzy-bluish-purple with very pale golden-ochreous markings*; there is an elongate triangular bar on the dorsum near the base, not reaching the costa; a curved transverse bar before the middle, broadest on the dorsum; two large spots on the costa before the apex and one near the tornus. The hind-wings are pale grey, finely speckled with darker, especially in the male.

For the extremely interesting particulars of the life history of this species, which follow, we are indebted to the energy and acumen of Mr. Morris N. Watt,* and,

*Trans. N.Z. Inst., iv., 327-331.

owing to the insect's subalpine habitat, any successful investigation of its habits, was a matter of considerable difficulty.

The full-grown larva is about 1 inch in length, cylindrical, spindle-shaped, its greatest diameter at the third abdominal segment, thence much attenuated towards either end. To the naked eye it is apparently without legs, these being very small, and it is very sluggish in its movements when exposed. The segments are shallowly incised, excepting the seventh and eighth abdominals. Spiracles small, brown, circular. Head small, flattened, light brown. General body-colour transparent shiny white. Tubercles and setae minute and very inconspicuous. The larva throughout its whole life mines within the bulb of the plant below the ground-surface. The duration of the larval existence is unknown, though from the length of the mines and age of the leaves containing them one may conclude that the larval stage occupies two, if not more, seasons.

Commencing in the region of the tip of the leaf, the gallery, at first about $\frac{1}{2}$ mm. in width, gradually assumes its markedly zigzag character, proceeding downwards between the midrib and the outer margin of the leaf; it never crosses the former barrier. As the mine descends, the angles of the zigzag increase in size. All mining is carried on in the bulb of the plant at or just below the surface of the ground; and as the leaves grow the gallery is stretched and elongated, and mostly loses resemblance to a typical mine, since the extremely thin outer cuticle is torn and in most places lost, excepting in the most recent portion of the gallery. The zigzag formation of the mine is necessitated by the situation of the larva in the bulb, and its extent is dependent on the rate of leaf-growth: during fast growth the successive angles will be large, while slow growth will cause the transverse portions of the gallery to be almost parallel to one another. Occasionally one will find a length of mine fairly straight for an inch or so, parallel to the long axis of the leaf and most usually close against the midrib; the reason for this may be found on careful search of this portion of the gallery—a cast skin adhering to the wall shows that a moult has taken place here, and while the larva was laying up for the purpose the leaf grew sufficiently to allow it later to mine normally parallel to the long axis till again arrested in the bulb and forced once more to zigzag.

Frequently in old leaves the mines may be found to terminate abruptly, or several inches may be missing; examination of the plant will reveal the continuation of the mine, or the missing portion, on some other leaf, and further examination will show that both leaves, at the time of the change, had been in close apposition to one another in the bulb, the larva having mined from one into the other, and perhaps later back again. One may find not a mine, but only a very faint and slight impression of one, on the surface of an otherwise sound leaf; this is due to the pressure caused by the larva mining in the leaf next against it while in the bulb. Never more than one larva will be found to be mining in one half of a leaf, but both halves of the same leaf may be mined by separate larvae. In such cases there is, as one would expect, a direct parallelism in the course of the mines.

The mine is usually on the under-side of the leaf, and is there very conspicuous; when appearing on the upper surface it is, as a rule, not so marked. The colour varies, with age, from green to dark brown.

In the next to last larval stadium the larva, practically mature, ceases mining (the gallery is now some 3-4 mm. wide),

and, leaving the gallery, forces its way, no longer downwards, but straight up for about 1½ in., till just below where the two contiguous leaves begin to separate; here, lying with the head uppermost and parallel to the axis of the leaf, it rests awhile; its body becomes much distended with clear fluid, and within it can be seen the next stadium larva about two-thirds the length of the old distended skin. When ready it bites a hole in the side of the old skin and emerges from it, the cast skin being flattened against the surface of the leaf, to which it may adhere for many months. The larva is now in its final stadium, the whole of which is occupied in the preparation of the cocoon, and lasts eight to fourteen days. Total length of the mine, possibly 3-4 ft.

The cocoon is constructed in rather a peculiar way. The larva, having moulted as above, between two applied leaves, makes a transverse cut of about 3-4 mm. in the outer (under) cuticle of the inner leaf, and, working upwards, insinuates itself under the cuticle; then, turning, it repeats the performance downwards, forming a shallow somewhat elliptical-shaped cavity between the cuticle and the remainder of the leaf. The transverse cut extending across its middle is now repaired with silk on the inside, and in the completed cocoon is difficult to find. The thin outer cuticle receives a liberal strengthening of silk on the inside, but the remainder of the cocoon-cavity receives little or none. As the leaf grows in length it carries the cocoon up with it, and in a few months it is some little distance above the ground, and so offers no difficulty to the emerging imago. The exposed cocoon is by no means conspicuous; externally, it is usually covered by the cast larval skin. It is shallow, elliptical, its ends somewhat pointed and depressed into the leaf; its long axis is parallel to that of the leaf; average size about 15 mm. by 3 mm. Owing to pressure by the larva whilst the leaves are still closely applied to one another, the leaf on the outside of the cocoon receives a hollow depression. The pupal stage lasts six to seven months, from February till mid-August.

The pupa lies in the cocoon in an upright position, its ventral surface innermost. Colour at first pale creamy white, becoming later light brown, darker on dorsum, to black with pale markings on wings prior to emergence. It is somewhat compressed dorso-ventrally, the ventral surface being more or less keeled or prominent along the mid-line. The shape of the pupa is frequently influenced by external pressure caused while the cocoon is still in the bulb.

The original specimens of the perfect insect were captured, by Mr. Philpott, late in December. Those reared by Mr. Watt emerged in August, and their emergence may have been accelerated by the warmth of the lowland locality where they were reared. Nevertheless, it is extremely probable that, in its natural surroundings, the moth normally appears in early spring. As nearly all the collecting in subalpine localities has been done after mid-summer, this fact would, as stated by Mr. Watt, explain the apparent rarity of the insect. That the mined leaves are extremely abundant entirely confirms this view.

Sub-family 9.—ELACHISTIDES.

Head smooth. Basal joint of antennae with pecten. Labial palpi moderate, curved, pointed. Maxillary palpi very short, appressed. Fore-wings with vein 1b simple, 6 and 7 stalked, 7 to costa, 8 out of 7 or absent. Hind-wings lanceolate, 2-4 nearly parallel, 5 absent, 6 and 7 stalked. (Plate G., figs. 1, 2, 3 neuration and head of *Elachista archaeonoma*.)

Represented in New Zealand by the cosmopolitan genus *Elachista*.

Genus 1.—ELACHISTA, Treitsch.

An extensive genus, widely distributed but principally known from Europe; the species are often overlooked. Larvae mining in grasses.

We have eight species in New Zealand. One is restricted to the North Island; three to the South Island, and four occur in both islands.

ELACHISTA ARCHAEONOMA.

(*Elachista archaeonoma*, Meyr., Trans. N.Z. Inst., xxi., 179.)

(Plate XXVIII, fig. 9 ♂, 10 ♀.)

Except in the extreme south this very active little insect is common and generally distributed throughout the country.

The expansion of the wings is about five-sixteenths of an inch. The fore-wings of the male are dark grey densely speckled with paler grey; there are two dull white marks a little before the middle followed by two blackish spots placed on the costa and dorsum and a blackish streak in the disc; there is a marginal series of black dots. The hind-wings are dark grey. In the female the fore-wings are white sprinkled with brown from the base to beyond $\frac{1}{2}$; there is a large blackish-brown blotch near the middle and a smaller blotch at the apex, the two being connected by a slender line in the disc; a number of large black scales is situated on the cilia. The hind-wings are very pale grey.

The perfect insect appears from August till March, occasional stragglers being met with on fine sunny days as late as June or July. It is often abundant in grassy places, and is very fond of the afternoon sunshine, when it may be seen running about on the blades of the grass, and taking wing with great agility. Pairing takes place towards sunset.

ELACHISTA OMBRODOCA.

(*Elachista ombrodoca*, Meyr., Trans. N.Z. Inst., xxi., 179.)

(Plate XXXVIII, fig. 4 ♂.)

This little insect has occurred commonly at Christchurch, Dunedin and Invercargill.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale grey (darker in the female) with two obscure whitish transverse bands near the middle (plainer in the female); there is an obscure black streak on the fold; two short longitudinal streaks near the middle of the costa and dorsum respectively and a rather long streak at the apex; the entire wing is thinly strewn with a few black scales. The cilia are grey with a few black scales. The hind-wings are grey.

The perfect insect appears from September till March, and is found on open grassy places, roadsides, etc., where it is often very common.

ELACHISTA EXAULA.

(*Elachista exaula*, Meyr., Trans. N.Z. Inst., xxi., 178; *Elachista watti*, Philp. ib. iv., 213.)

(Plate XLVII, fig. 3 ♂; Plate XXVIII, fig. 15 ♀ variety.)

This delicate-looking little species has occurred in the North Island on Mount Ruapehu and on the hills on the eastern side of Wellington Harbour. In the South Island it has been found on Mount Arthur and on the banks of the Maitauri River.

The expansion of the wings is five-sixteenths of an inch. The fore-wings are elliptical, cream-coloured, very finely speckled with darker; there is a chain of minute black dots along the basal portion of the fold; a small cluster at the end of the fold and another rather irregular chain of minute black dots before the apex. The hind-wings and all the cilia are grey.

A remarkable variety of this species having the apical three-fifths of the fore-wings clouded with grey is depicted on Plate XXVIII, fig. 15. Another form, having the usual black markings on the fore-wings absent, has been described by Mr. Philpott as a distinct species, under the name of *Elachista watti*.

The perfect insect appears in September and March, flying freely amongst grass in the afternoon sunshine.

ELACHISTA HELONOMA.

(*Elachista helonoma*, Meyr., Trans. N.Z. Inst., xxi., 178.)

(Plate XXVIII, fig. 14.)

This neat-looking little species is common on the Port Hills near Christchurch.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale whitish-ochreous speckled with numerous blackish dots; there is a dense chain of larger dots forming a streak from the base to about $\frac{1}{2}$ and another streak from above this to the apex; the dots are also more numerous on the dorsum. The hind-wings are greyish-ochreous.

The perfect insect appears from January till March, and is abundant amongst tussock grass to which it appears attached.

Described and figured from a specimen in the Fereday collection.

ELACHISTA THALLOPHORA.

(*Elachista thallophora*, Meyr., Trans. N.Z. Inst., xxi., 178.)

(Plate XLVI, fig. 12 ♂.)

This very narrow-winged species has occurred at Waiouru, Paekakariki and Wellington in the North Island, and at Mount Arthur, Christchurch, and Dunedin in the South Island.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are very narrow with the apex acutely pointed; dark greyish-ochreous; there is a very fine longitudinal white streak slightly above the middle and a much broader streak below the middle. The hind-wings are narrow, with the apex extremely acute; greyish-ochreous.

The perfect insect appears from November till February. It is found in grassy places, but is extremely local. Mr. Meyrick points out that the variation in size is noteworthy, some of the largest females being twice as large as the males. The species is a remarkably distinct one, but recalls *E. rufocinerea*, to which it has probably some real relationship.

ELACHISTA GERASMIA.

(*Elachista gerasmia*, Meyr., Trans. N.Z. Inst., xxi., 177.)

(Plate XXVIII, fig. 11.)

This pretty species has occurred at Auckland, Hamilton, Makotuku, Ida Valley, Lake Wakatipu, and Invercargill.

The expansion of the wings varies from considerably under to slightly over $\frac{1}{2}$ inch. The fore-wings, which have the costa rather strongly arched and the apex acute, are greyish-ochreous.

sometimes obliquely clouded with pale brown on the apical half; there is an elongate black spot on the fold before the middle and a similar larger spot in the disc beyond the middle; a few scattered blackish-brown scales are often situated between these two spots and on the cilia below the apex. The hind-wings are rather dark grey.

The perfect insect appears in December, January and March. According to Mr. Meyrick it is common in swampy places and is also found in Australia.

ELACHISTA MELANURA.

(*Elachista melanura*, Meyr., Trans. N.Z. Inst., xxi., 177.)

A single specimen of this species was captured by Mr. Meyrick at Hamilton.

The expansion of the wings of the male is slightly under $\frac{1}{2}$ inch. Head, palpi, antennae, and thorax whitish-grey. Abdomen ochreous-whitish, with a dense black apical exsertible tuft. Legs dark fuscous, posterior pair ochreous-whitish. Fore-wings lanceolate; whitish-grey, somewhat irrorated with darker; an elongate black dot on fold before middle, a second in disc above middle, and a third in disc at $\frac{3}{4}$; cilia grey-whitish, with a spot of black scales at base round apex, and tips sprinkled with black. Hind-wings and cilia pale whitish-grey.

I am unacquainted with this species. The above particulars are taken from the original description.

ELACHISTA OCHROLEUCA.

(*Elachista ochroleuca*, Meyr., Trans. N.Z. Inst., liv., 167.)

(Plate XL, fig. 9 ♂.)

This little species is common on the lower slopes of Mount Aurum between 3,000 and 4,000 feet above the sea-level. It has also occurred on Arthur's Pass.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are creamy-white with a faint yellowish dot near the end of the fold and a few very pale yellowish scales near the apex. The hind-wings are greyish-white. The palpi and antennae are grey.

The perfect insect appears in January, and is found amongst tussock grass.

Sub-family 10.—SCYTHRIDES.

Head smooth. Labial palpi moderate, curved, pointed. Maxillary palpi very short, appressed. Fore-wings with vein 1b simple or short-furcate, 2 from angle, 6 and 7 stalked, 7 to costa, 8 absent. Hind-wings lanceolate; veins all separate, nearly parallel.

Genus 1.—SCYTHRIS, Hübner.

A large genus of general distribution, but more especially European. We have one species in New Zealand.

SCYTHRIS EPISTROTA.

(*Bupalis epistota*, Meyr., Trans. N.Z. Inst., xxi., 161.)

(Plate XXVIII, fig. 13.)

This rather stout-looking, short-winged little species has occurred on the Lyttelton Hills near Christchurch, at Queenstown, Lake Wakatipu, Ida Valley and on Mount Arthur at an elevation of 4,500 feet.

The expansion of the wings is considerably under $\frac{1}{2}$ inch. The fore-wings, which have the costa strongly arched and the apex very acute, are bronzy-brown thickly streaked with white. The hind-wings are very pale greyish-ochreous and the cilia of

all the wings rather dark bronzy-brown. The body is rather stout, bronzy-grey, the abdomen being densely clothed with whitish scales towards the apex.

Mr. Meyrick states that "in paler specimens there are indications of two very ill-defined inwardly oblique darker streaks on the anterior half of the fore-wings more distinctly spotted with darker on fold, and two less perceptible outwardly oblique streaks on posterior half."

The perfect insect appears in January, apparently frequenting open grassy country, but evidently very local. Where found, however, it is stated to be common.

Sub-family 11.—HYPNOMEUTIDES.

Head with appressed scales or rough on crown. Labial palpi moderate, ascending, rather pointed. Maxillary palpi rudimentary or obsolete. Fore-wings with costal stigmata between 11 and 12, 7 and 8 separate or stalked, 7 to termen. Hind-wings elongate-ovate or lanceolate; 4 absent. (Plate K, figs. 1-3.)

A considerable sub-family, generally distributed, but almost absent from New Zealand, where only one genus is represented.

Genus 1.—ZELLERIA, Stt.

(Plate K, figs. 1, 2, 3 neurulation and head of *Zelleria copidota*.)

Head rough on crown. Hind-wings lanceolate.

This genus, which is of moderate extent and generally distributed, is represented in New Zealand by three species.

ZELLERIA COPIDOTA.

(*Circostola copidota*, Meyr., Trans. N.Z. Inst., xxi., 163.)

(Plate XXXV, fig. 11 ♀.)

This species, which may be at once recognised by the strongly-arched costa and very acute apex of the fore-wings, has occurred on Mount Egmont, at Wellington, Nelson, Otira River and Lake Wakatipu.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are pale reddish-brown thickly speckled with darker brown; there is a very broad white streak on the dorsum from the base to about $\frac{1}{2}$, broadest near the base; a slender dark brown central streak on the fold followed by another streak almost reaching the apex. The hind-wings, which are very pointed, are white, faintly tinged with ochreous.

The perfect insect appears in December and January, and frequents forest. It seems to be attached to tutu bushes (*Coriaria*), on which its larva may possibly feed. When at rest it stands on the fore- and middle-legs with the thorax closely appressed to the ground; the posterior legs are hidden by the wings and both considerably elevated, giving the insect the appearance of a small broken twig; the antennae are laid closely along the outside of the costa of each wing; the wings form a steep though very narrow roof, and the cilia give a truncated appearance to the extremity of the insect.

ZELLERIA RORIDA.

(*Zelleria rorida*, Philp., Trans. N.Z. Inst., 1, 130.)

(Plate XXXVIII, fig. 14 ♂.)

This handsome species was discovered by Mr. Philpott near the Bluff. It has also occurred in Central Otago.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are very narrow oblong, creamy-white very thickly sprinkled with purplish-brown scales except near the dorsum; the disc is clouded with warm brown; there is a broad curved oblique dark brown band at about $\frac{3}{4}$; a dark brown blotch on the dorsum before the middle and two or three longitudinal rows of elongate black dots, most conspicuous below the costa and on the fold; there is a reddish-brown line around the apex and an oblique whitish patch before the apex. The cilia are dark brown round the apex, whitish-brown elsewhere. The hind-wings are whitish grey, with whitish-brown cilia.

The perfect insect appears in November, and seems mostly attached to forest near the sea coast.

Described and figured from Mr. Philpott's specimens.

ZELLERIA SPHENOTA.

(*Hofmannia sphenota*, Meyr., Trans. N.Z. Inst., xxi., 162.)

A single specimen of this species was found by Mr. Meyrick at Christchurch.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch. Legs fuscous, posterior pair ochreous-whitish. Fore-wings very elongate, very narrow, parallel-sided, long-pointed, acute; pale ochreous thinly and irregularly sprinkled with dark fuscous and whitish; basal half of costa dotted with black; a moderately-broad ill-defined cloudy-white streak along dorsum from base to tornus, pointed at extremities, interrupted at $\frac{3}{4}$ by a small spot of ground-colour; a cloudy inwardly-oblique dark fuscous mark at $\frac{1}{2}$ from near costa to near dorsum; cilia ochreous-grey-whitish, round apex ochreous, with base white, a grey line, and three cloudy dark grey bars. Hind-wings pale whitish-grey; cilia ochreous-grey-whitish.

The perfect insect appears in August.

I am unacquainted with this species. The above is taken from the original description.

Sub-family 12.—GRACILARIAES.

Head with appressed scales. Antennae 1 or over 1. Labial palpi slender, ascending, tolerably pointed. Maxillary palpi moderate, filiform, porrected. Fore-wings with vein 7 and 8 stalked or separate. Hind-wings lanceolate or linear. (Plate II., figs. 27-29.)

An extensive sub-family of general distribution.

The insects comprised in this sub-family are amongst the most graceful of the Lepidoptera. The wings are extremely narrow and often brilliantly coloured; the antennae and legs very long and slender and, in the typical genus *Gracilaria*, the tibiae of the middle pair of legs are thickened with a dense clothing of scales, which is probably a scent organ for purposes of sexual attraction. The position assumed in repose is very remarkable, the head and anterior part of the body being elevated, the fore- and middle-legs stretched out a little sideways, and the posterior legs placed against the side of the abdomen.

The sub-family is represented in New Zealand by the three following genera:

1. ACROCERCOPS.
2. PARECTOPA.
3. GRACILARIA.

Genus 1.—ACROCERCOPS, Wall.

Middle tibiae not thickened; posterior tibiae with series of projecting bristly scales above.

A large genus, principally developed in the Indo-Australian region. The larvae usually mine blotches in leaves. We have two species in New Zealand.

ACROCERCOPS CYANOSPILA.

(*Conopomorpha cyanospila*, Meyr., Trans. N.Z. Inst., xviii., 183.)
(Plate XXXV., fig. 14 ♀.)

This rather sombre, though very elegant species, has occurred in the North Island at Taupo, Taranaki, Palmerston North, Makotuku and Masterton, where it is stated to be common. It is an exceedingly rare insect in the neighbourhood of Wellington. In the South Island it has occurred at Picton, on D'Urville Island, and at Motueka.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are dark brown with numerous irregular scattered whitish spots, tending to form stripes; there is an irregular, transverse, white patch at about $\frac{3}{4}$ followed by a metallic blue line and a small metallic blue apical spot. The hind-wings are dark brownish-grey.

I am informed by Dr. Myers, that the larva of this insect feeds concealed in the berries of the Titoki. (*Alectryon excelsum*.)

The perfect insect appears in November, February and March, and frequents dense forest. Mr. Meyrick states that, in repose, the imago sits either with the fore-part raised as in *Gracilaria*, or closely appressed to surface, but with the four anterior legs laterally extended; the latter position is apparently the most habitual, serving to conceal it on the tree-trunks, on which it usually sits. I can testify to the accuracy of this observation.

ACROCERCOPS ZORIONELLA.

(*Parectopa zorionella*, Huds., Ent. Mo. Mag. liv., 62.)
(Plate XXXV., fig. 5 ♂.)

This very distinctly-marked species was discovered in the Botanical Gardens at Wellington. It has also occurred at Waitomo and on Mount Egmont up to 4,000 feet.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-oblong with the costa strongly arched; very dark brownish-black with very vivid steely-blue reflections; there is a large semi-circular silvery-white spot on the costa a little beyond the middle; an oblique silvery-white bar beyond $\frac{3}{4}$ and two much smaller bars just before the apex; there are three minute silvery spots on the dorsum. The hind-wings are dull steely-grey. The cilia of the fore-wings are black of the hind-wings dark grey tinged with bronze towards the body.

According to Mr. Morris N. Watt the larva mines the leaves of several species of *Coprosma*.*

The perfect insect appears in November and frequents scrub. The general wing-pattern in this insect somewhat approximates to that of *Bascanitis sirenica* (Plate XXXVII., fig. 23), and both these species, when the wings are closed over the back, have a superficial resemblance to the brilliantly-coloured small longicorn beetle *Zorion gutti-*

*Trans. N.Z. Inst., lii., 445.

gerum. These resemblances may, of course, be purely fortuitous, but they seem sufficiently close to suggest the possibility of some kind of protective mimicry, and on this account merit further investigation.

Genus 2.—PARECTOPA, Clem.

Middle tibiae not thickened; posterior tibiae without bristly scales.

This genus is of considerable extent and generally distributed. We have six species in New Zealand, three confined to the North Island, and three found in both islands.

PARECTOPA PANACIVAGANS.

(*Parcetopa panacivagans*, Watt., Trans. N.Z. Inst., lii., 464.)

(Plate XLVII, fig. 8 ♂.)

This very distinct species has occurred at Aberfeldy near Wanganui, and at Dunedin.

The expansion of the wings is five-sixteenths of an inch. The fore-wings are black with very pale bluish-white markings; the basal fifth is very pale bluish-white with two narrow blackish bars not reaching the costa; there is an oblique oblong spot on the costa at about $\frac{1}{3}$; a large semicircular blotch at $\frac{2}{3}$; a much smaller blotch before the apex and a small elongate mark in the middle of the wing close to the apex; on the dorsum there is an oblique oblong blotch near the middle and a nearly semicircular spot before the tornus. The hind-wings and cilia of all the wings are pale grey; there is a row of black scales in the cilia around the apex of the fore-wings.

The larva mines the leaves of the lancewood (*Pseudopanax crassifolium*).

The perfect insect emerged in February.

Described and figured from a specimen kindly lent me by Mr. Watt.

PARECTOPA AETHALOTA.

(*Gracilaria aethalota*, Meyr., Proc. Linn. Soc. N.S. Wales, 1880, 143; Trans. N.Z. Inst., xxi. 185; *Parectopa panacitortis*, Watt., ib., lii. 457.)

(Plate XLVI, fig. 11 ♀.)

This dark-looking little species has occurred at Mount Egmont, Wellington, and Dunedin.

The expansion of the wings is $\frac{1}{4}$ inch. The fore-wings are dark steely-purplish-blue speckled with lighter and very glossy; there are two small irregular patches of ochreous scales on the costa before the apex, several near the apex and along the termen and dorsum. The hind-wings are dark grey. The cilia of all the wings are blackish with a white apical hook on the fore-wings. The palpi are whitish with the apex of the second joint and a sub-apical ring of the terminal joint black.

According to Mr. Morris N. Watt, the larva mines the bark of *Nothopanax arboreum*.

The perfect insect appears in December and January and may be looked for amongst scrub. It is extremely rare but most likely to be found by careful sweeping.

PARECTOPA CITHARODA.

(*Gracilaria citharoda*, Meyr., Trans. N.Z. Inst., xlviii., 418.)

(Plate XXXV, fig. 15 ♀.)

This very beautiful and clearly-marked species has occurred at Auckland, Wanganui and Wellington.

The expansion of the wings is considerably under $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical; brownish-black becoming bronzy towards the apex; there are three very oblique, slightly curved, white bars from the costa with three fainter bars between them and two additional much shorter white bars before the apex; a wavy irregular cream-coloured patch on the dorsum extending from the base to about $\frac{2}{3}$ followed by three white bars which almost join the white bars on the costa; the central portions of the wing are darker; there is a conspicuous black bar in the disc broken by a clear white dot before the apex. The hind-wings are blackish-grey and the cilia of all the wings blackish. The palpi, head and central portion of the thorax are clear white.

According to Mr. Morris N. Watt the larva, which mines the leaves of *Acacia*, is about $\frac{1}{4}$ inch in length; greenish-yellow with a faint white spiracular line; the body is covered with a fine pile; prolegs are situated on segments 3, 4 and 5 of the abdomen.

The pupa is enclosed in a delicate silken cocoon, covered with minute white floccy globules.*

The perfect insect appears in December, and frequents scrubby forest, flying rapidly in the late afternoon sunshine.

PARECTOPA LEUCOCYMA.

(*Gracilaria leucocyma*, Meyr., Trans. N.Z. Inst., xxi., 184.)

A single specimen of this species was captured by Mr. Meyrick at Auckland.

The expansion of the wings of the female is about $\frac{3}{4}$ inch. Head and palpi white. Antennae fuscous, beneath white. Thorax light grey. Abdomen whitish. Legs dark grey, ringed with white, posterior tibiae white. Fore-wings elongate, very narrow, pointed; grey; markings snow-white; a rather broad irregular streak along dorsum from base to apex, interrupted before middle by a very oblique indistinct line of ground-colour; eight short more or less wedge-shaped streaks from costa, first from $\frac{1}{4}$, slenderly produced on costa towards base, first four outwardly oblique, remainder inwardly oblique, second and fourth reaching half across wing, the rest much shorter; a small irregular blackish apical dot, preceded by a white dot; cilia ochreous-grey-whitish, round apex whiter, with indications of two dark fuscous lines. Hind-wings whitish-grey; cilia ochreous-grey-whitish.

The perfect insect appears in December.

I am unacquainted with this species. The above is taken from the original description.

PARECTOPA AËLLOMACHA.

(*Gracilaria aëllomacha*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 158; Trans. N.Z. Inst., xxi., 184; *Macarostola aëllomacha*, ib., xli., 14; *Parectopa panacitortis*, Watt, Trans. N.Z. Inst., li. 449; *Parectopa panacivermiformis*, ib., 452; *Parectopa panacifnens*, ib., 460.)

(Plate XXXV, fig. 4.)

This fragile-looking species has occurred at Auckland, Mount Egmont, Wanganui, Wellington, Christchurch, Dunedin and Longwood Range, Southland.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings, which are very narrow, are snow white with pale brown and blackish markings; there is a cloudy pale brown central longitudinal streak, fainter towards the base and sometimes

*Trans. N.Z. Inst., xlviii., 407.

obsolete; about six oblique blackish bars on the costa and three or four much paler brownish bars on the dorsum; the cilia are grey becoming white round the apex, with two blackish lines and a more or less distinct blackish apical hook. The hind-wings are pale grey with grey cilia.

There is considerable variation in size, in the general depth of the colouring and in the extent of the pale brown and blackish markings. In some forms the dark bars on the costa are reduced in number; in others the whole of the wing is more less densely speckled with blackish, except on certain spaces between the costal and dorsal bars which are thus transformed into white blotches or bars. Taken apart some of these extreme forms might readily be classed as distinct species, but in view of the intermediate forms which occur they can only be regarded as varieties. According to Mr. Morris N. Watt the larva mines the leaves of *Nothopanax arboreum*, *N. Sinclairii* and *N. simplex*.*

The perfect insect appears in September, December, January and February, and is found in forests, from the sea-level to an elevation of about 3,000 feet. Although widely distributed it does not appear to be a very common species.

PARECTOPA MINIELLA.

(*Coriscium minicellum*, Feld., pl. cxl. 42; Meyr., Trans. N.Z. Inst., xxi. 185; *Gracilaria ethela*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 152; *Macarostola miniella*, Meyr., Trans. N.Z. Inst., xli. 14).

(Plate XXXV., fig. 8 type; fig. 9 variety.)

This exquisite little species, which is probably the most magnificently coloured insect in New Zealand, has been taken at Kaeo, Hamilton, Taranaki, Palmerston North and Wellington. It is a very local species, though sometimes fairly plentiful in the far north. At present no specimens have been recorded from the South Island.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are pale yellow, darker towards the dorsum; there is a brilliant crimson wavy central streak from the base to the apex, connected with both costa and dorsum near the base, and with the dorsum only, by three broad bars, at $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$; there is a large crimson spot at the apex containing a small black spot and a much larger white spot. The hind-wings are pale crimson with grey cilia on the costa; the rest of the cilia are pale crimson.

A variety occurs in which all the crimson colouring is replaced by pale brown, margined with darker brown.

The perfect insect appears from January to March and in June, frequenting the depths of the forest. In his original description† of this exceedingly beautiful insect Mr. Meyrick justly remarks as follows: "I took seven very perfect specimens (six typical, one of the variety) amidst dense growth in the swampy virgin forest near Hamilton, on the Waikato, in January, mostly under tree-ferns. New Zealand insects are usually rather sombre; and I shall not easily forget the emotion with which, in the depths of the forest shades, I saw this lovely insect, whose ethereally pure hues cause it to be one of the most wonderful mani-

festations of the beauty of nature." In a subsequent description† he adds: "The variety occurs with the type, but much more scantily in the proportion of about one to fifteen."

Genus 3.—GRACILARIA, Haw.

Middle tibiae thickened with dense scales; posterior tibiae without bristly scales. (Plate H., figs. 27, 28, 29 neurulation and head of *Gracilaria linearis*.)

A large genus, universally distributed. There are five species in New Zealand. One is confined to the North Island; one to the South Island, and three occur in both islands.

GRACILARIA LINEARIS.

(*Gracilaria linearis*, Butl., Proc. Zool. Soc. Lond., 1877, 406, pl. xliii. 16; Meyr., Trans. N.Z. Inst., xxi. 183; ib., xliii. 67).

(Plate XXXV., fig. 6 ♂.)

This rather variable species appears to be common and generally distributed throughout the country.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate and very narrow; dull yellowish-brown with purplish-brown markings and faint purplish reflections; there are several spots on the costa; two long chains of minute black dots, one series below the costa, the other series above the dorsum. The hind-wings are very pale greyish-ochreous faintly tinged with ochreous-brown towards the apex. There is considerable variation. Some specimens have three, more or less distinct, large pale spots on the costa. In others the fore-wings are clouded with purplish-brown except a pale streak along the dorsum.

The perfect insect appears from October till February, and frequents forests where it is sometimes very abundant, especially about midsummer.

GRACILARIA ELAEAS.

(*Gracilaria elaeas*, Meyr., Trans. N.Z. Inst., xliii. 66.)

(Plate XXXV., fig. 3 ♀.)

This species, which is very similar to the last, has occurred at Christchurch, Castle Hill West Coast Road, Ida Valley Central Otago, Ben Lomond, Lake Wakatipu, and the Hunter Mountains.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are ochreous with brassy reflections; there are two rows of black dots running parallel with the costa and dorsum and an obscure silvery streak in the disc. The hind-wings are dark grey with grey cilia.

According to Mr. Meyrick the larva has fourteen legs, is moderately stout, cylindrical, tapering at both ends; dull grey-greenish or grey-yellowish; the dorsal line is darker; the sub-dorsal line broad grey or obsolete and the head and plate on second segment dark brown. It feeds between spun-together leaves or shoots of tutu (*Coriaria*) in January. The larva habit is most unusual and the food-plant highly poisonous.

The perfect insect appears from November till February, and is found in open, or scrubby, places where its food-plant abounds. It has been taken on mountain slopes to 3,500 feet above the sea-level.

*Trans. N.Z. Inst., lii., 449-463.

†Proc. Linn. Soc. N.S.W. 1880, 153.

†Trans. N.Z. Inst., xxi., 185.

GRACILARIA SELENITIS.

(*Gracilaria selenitis*, Meyr., Trans. N.Z. Inst., xli., 15.)
(Plate XXXV., fig. 1 ♀.)

This rather bright-looking species was discovered on the lower slopes of Mt. Holdsworth, Taranaki Range, at an elevation of about 3,000 feet above the sea-level. It has also occurred on Mt. Arthur and is generally distributed throughout Otago and Southland.

The expansion of the wings is under $\frac{1}{2}$ inch. The forewings are very elongate, narrow, with the costa strongly arched and the apex acute; *bright golden brown*, finely speckled with darker brown, with faint purplish reflections; *there are three rather large pale yellow spots on the dorsum*. The hind-wings are pale grey.

Appears to vary somewhat in the general brilliancy of the colouring. A very dark form is common in the sub-alpine forest on Mount Arthur about 3,500 feet above sea-level.

According to Mr. Morris N. Watt the larva mines the leaves of the silver beech (*Nothofagus Menziesii*.*)

The perfect insect appears from September till February, and in the North Island probably frequents forest-clad ranges at elevations of about 3,000 feet above the sea-level. Mr. Philpott states that in Otago it is generally distributed in beech forests from 2,500 feet upwards and is met with during December, January and February. The species is extremely common, and when a number of them is disturbed from the beech-foliage a clicking sound, like the pattering of raindrops, may be heard. He is unable to offer any explanation as to how this sound is produced.†

GRACILARIA CHRYSITIS.

(*Gracilaria chrysis*, Feld. Reis. Nov., pl. cxl. 43; Meyr. Trans. N.Z. Inst., xxi., 183; *G. adelina*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 142; *G. rutilans*, Butl., Cist. Ent., ii., 561.)
(Plate XXXV., fig. 10 ♂.)

This very handsome species has occurred at Kaco, Auckland, Hamilton, Palmerston North, Wellington, Picton, Christchurch and Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. *The forewings are very deep orange-red with coppery and purplish reflections; there is a very broad golden costal band; a deep purplish-blue discal spot before the middle and a series of minute blue streaks on the dorsum*. The hind-wings are grey. The intermediate legs have the femur and tibia thickened and densely clothed with brilliant red scales interspersed with a few brilliant blue scales.

The perfect insect appears from September till November, and from January till April. It frequents damp places in the forest, but is very local, although apparently fairly common in the northern parts of the North Island. The position assumed by this species, when at rest, is extraordinary. The wings are closely rolled around the body; the antennae placed backwards along the mid-back. The anterior and intermediate legs are each placed close together tiptoe, and form with the wings, a tripod, which supports the insect in a position inclined at about 45 de-

grees from the horizontal. The hind-legs and body are altogether hidden within the cylinder formed by the wings. The silver colouring on the underside of the head and thorax is most conspicuous, as well as the tufts of scales on the intermediate tibiae. These features confront the observer when facing "the tripod," and collectively give the insect a most unreal appearance.

GRACILARIA CHALCODELTA.

(*Gracilaria chalcodeelta*, Meyr., Trans. N.Z. Inst., xxi., 183.)
(Plate XXXV., fig. 7 ♂.)

Although apparently generally distributed throughout the North Island this pretty species is never met with in any numbers. It has not been recorded from the South Island at present.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The forewings are very elongate and narrow with the apex long pointed; *reddish-ochreous with strong purple reflections and numerous minute yellowish streaks; there is a large, somewhat triangular golden-yellow mark on the costa before the middle*, and a cloudy patch of blackish scales at the apex. The hind-wings are grey.

The perfect insect appears from December till March, and frequents forest. When settling after flight, each antenna is swung alternately for some little time, their ends describing circles. The wings are tightly closed around the body, their tips touching the object on which the insect is resting. The head is raised up, and the entire body and wings held at an angle of about 20 degrees. The hind-legs are closely appressed to the body, the tarsi being slightly divergent and helping to support the tip of the wings and the body in the position already described. The fore- and intermediate legs are held close together, only the tips of the tarsi touching the support. The tibiae of the intermediate legs are enlarged by a dense clothing of blackish scales and this is very conspicuous when the insect is resting. The antennae are placed backwards along the middle of the wings. One of the tarsi of the fore-legs is often held clear of the ground and vibrated with the antennae.

Sub-family 13.—PLUTELLIDES.

Head usually with appressed scales. Labial palpi bent, ascending, pointed, terminal joint as long as second or longer. Maxillary palpi rather short, filiform, porrected. Forewings with vein 7 and 8 separate or stalked. Hind-wings trapezoidal-ovate or elongate-ovate. (Plate A., figs. 7-9; Plate G., figs. 31, 32, 33; Plate H., figs. 30-38 and 42-44).

A small sub-family of considerable antiquity. Nine genera are represented in New Zealand.

- | | |
|-------------------|----------------|
| 1. THAMBOTRICHIA. | 5. PHYLACODES. |
| 2. DOLICHERNIS. | 6. CADMOGENES. |
| 3. DOXOPHYRTIS. | 7. ORTHENCHES. |
| 4. PROTOSYNAEMA. | 8. PLUTELLA. |
| 9. CIRCOXENA. | |

Genus 1.—THAMBOTRICHIA, Meyr.

Head with appressed scales; ocelli posterior; tongue developed. Antennae five-sixths, in ♂ slender, joints elongate, with spreading whorls of extremely long fine ciliations, basal

*Trans. N.Z. Inst., iv., 681.

†Ib. xlix., 235.

joint moderate, rather stout, with rather small pecten. Labial palpi long, recurved, second joint thickened with scales forming a very short apical tuft beneath, terminal joint somewhat shorter than second, rather thickened with scales, pointed. Maxillary palpi very short, drooping, filiform. Posterior tibiae with series of rough projecting bristly scales above. Fore-wings with vein 1b furcate, 2 from five-sixths, 7 to termen, 11 from middle. Hind-wings $\frac{1}{2}$, elongate-trapezoidal, cilia $1\frac{1}{2}$; 2 remote, 3 and 4 approximated at base, 5-7 somewhat approximated towards base.

A remarkable form, perhaps nearest to *Dolichernis*, but very distinct.

Only one species is known at present.

THAMBOTRICHIA VATES.

(*Thambotricha vates*, Meyr., Entomologist, iv. 270, 1922; Trans. N.Z. Inst., 1, 205.)
(Plate L., fig. 11 ♂.)

This very interesting species was discovered by Edward C. Clarke in Gollan's Valley, near Wellington. Mr. Philpott has also found it at the Aorere River, Nelson.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings have the costa sinuate, strongly arched near the middle and again just before the apex, the apex *acutely pointed* and the termen deeply excavated below the apex; reddish-ochreous, strongly shaded with bright reddish-brown on the basal and terminal areas; there is a dark brown dot above the fold at $\frac{1}{2}$ and two obscure pale dots in the disc at about $\frac{2}{3}$, the latter being irregularly surrounded by a small brownish suffusion; the cilia are reddish-brown, except on the termen below the apex where they are clear ochreous. The hind-wings are *narrow oblong*, very elongate with the apex slightly produced and the termen oblique, pale ochreous; the cilia are pale ochreous. The antennae are nearly as long as the fore-wings with the middle joints dentate; in the male a small tuft of long cilia arises at each dentation; the ciliations of the basal portion being extremely long. The fore-legs have the basal joint of the tarsus very long. The hind tibiae are densely clothed with rather short stout ochreous bristles. There is a tuft of long hair on each side of the second segment of the abdomen of the male.

The perfect insect appears in March, and frequents forest.

Genus 2.—DOLICHERNIS, Meyr.

Head rough on crown. Antennae over 1, basal joint with pecten. Fore-wings with vein 4 absent. Hind-wings with 3 and 4 connate. (Plate H., figs. 30, 31, 32 neuration and head of *Dolichernis chloroleuca*.)

An endemic genus represented by two species.

DOLICHERNIS CHLOROLEUCA.

(*Dolichernis chloroleuca*, Meyr., Trans. N.Z. Inst., xxiii., 99.)
(Plate XXXVI., fig. 2 ♂.)

This interesting insect is fairly common in the Wellington District. It has also occurred at Raurimu, Waimarino, Ohakune and Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The antennae are longer than the fore-wings. The fore-wings have the costa moderately arched near the apex and the termen oblique; pale shining ochreous with brown or orange-brown markings; there are one or two small elongate marks on the fold and three or four similar marks in the disc above the fold; a cloudy patch on the dorsum at $\frac{1}{2}$; a faint patch on the tornus and a distinct apical streak enclosing a small faint costal patch. The hind-wings are moderately broad, white, tinged with brown near the apex.

Some specimens are almost white with the markings nearly obliterated. In others the costal and dorsal portions of the fore-wings are thickly sprinkled with pale brown, or golden-ochreous scales.

The perfect insect appears in November and December and again in April, frequenting forest. It rests on the upper sides of fern fronds and other foliage, often fully exposed to view. When thus at rest the wings are rolled around the body; the hind- and intermediate legs withdrawn and used for standing; the anterior legs being extended and the palpi arched around the head, with their tips almost in contact in front. The antennae are placed backwards close to the body and are almost invisible. In assuming this attitude the insect attains the closest possible resemblance to a minute, whitish-coloured, dead stick, and this no doubt effectually protects it from the attacks of many enemies and renders the usual means of concealment unnecessary.

DOLICHERNIS JUBATA.

(*Dolichernis jubata*, Philp., Trans. N.Z. Inst., 1, 131.)
(Plate XL., fig. 5 ♂.)

This interesting species has occurred at Kaeo, north of Auckland, Wellington, and at Tisbury near Invercargill.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical with the apex and tornus rounded; pale ochreous broadly clouded with black on the costa; the plical and two discal spots are black and very conspicuous, and there is a blackish patch near the termen. The hind-wings, which have the apex rounded, are greyish-ochreous. The cilia of all the wings are ochreous mixed with blackish.

The perfect insect appears in January and frequents forest.

Genus 3.—DOXOPHYRTIS, Meyr.

Basal joint of antennae without pecten. Hind-wings with vein 3 and 4 connate.

Another endemic genus represented by a single species only.

DOXOPHYRTIS HYDROCOSMA.

(*Doxophyrtis hydrocosma*, Meyr., Trans. N.Z. Inst., xlv., 113.)
(Plate XXXIV., fig. 15 ♀.)

This very distinct species is common in the north of the North Island, inhabiting forests where the Nikau Palm (*Rhopalostylis sapida*) is abundant. It is a very rare insect in the Wellington District.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate-oblong with the apex rounded and the termen oblique; dull greyish-green with numerous fine black-edged yellow markings; there is a longitudinal stripe from the base to about $\frac{1}{2}$; two conspicuous oblique marks meet this from the costa as well as numerous fainter marks; below, the longitudinal line is connected with the dorsum by numerous wavy, oblique, transverse lines; there are two cloudy grey patches on the dorsum, a confused series of minute yellow and blackish marks near the tornus and two yellow patches at the apex; the ground colour of the apical area is strongly tinged with blue. The hind-wings are blackish-grey, sometimes with a large, cloudy, pale brown patch below the middle.

This species varies slightly in the general depth of the ground colour and also in the intensity of the markings, but is always easily recognised.

The pupa is enclosed in an elongate, white, silken-cocoon, but beyond this nothing is known of the life-history of this species.

The perfect insect appears in January. It seldom takes wing, but may be found resting on the stems of the Nikau Palms where its colouring is highly protective, as many as half a dozen specimens being often found on a single tree. When resting the wings are tightly closed over the back, forming an elongate steep roof; the fore- and intermediate legs are exposed and the antennae placed loosely backwards outside the wings. This insect always stands on the tree-trunk with its head pointing towards the ground.

Genus 4.—PROTOSYNAEMA, Meyr.

Antennae thickened with scales towards base, basal joint without pecten. Fore-wings with 7 and 8 separate. Hind-wings with 3 and 4 remote. (Plate H., figs. 36, 37, 38 neuration and head of *Protosynaema steropucha*.)

We have three species of this interesting endemic genus.

PROTOSYNAEMA STEROPUCHA.

(*Protosynaema steropucha*, Meyr., Trans. N.Z. Inst., xviii., 174.)
(Plate XXXIV., fig. 2 ♂; Plate III., figs. 19, 20 larvae;
fig. 21 pupa.)

This very unusual-looking species is generally common in the Wellington district. It has also occurred at Auckland, Hamilton, Mount Egmont, Christchurch and Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The antennae are heavily clothed with masses of black scales giving them a very thickened appearance except at the tips, which are yellowish-white. The fore-wings are elongate-oblong with the costa strongly arched at the base and the termen slightly oblique; very dark blackish-brown more or less clouded with grey towards the dorsum; there is a strongly curved blackish line from the costa near the base, to the disc near the middle and a blackish bar on the dorsum near the tornus, both these markings being thickly powdered with coppery-metallic scales; two black dots surrounded by coppery metallic scales are also situated at the tornus. The hind-wings are dark blackish-brown with bronzy reflections.

There is much variation in the depth of the colouring, some specimens being very much paler than others. In these pale forms the usually very obscure darker markings are much more distinct.

The larva, which feeds on grasses, is about five-sixteenths of an inch in length, elongate, much attenuated posteriorly, pale brown or green, much paler beneath with three or four darker lines on each side and a straight, pale, broad dorsal line. There are numerous transverse wrinkles, and a number of isolated black bristles on the larva. The head is pale yellowish with four of the most conspicuous lateral brownish lines continued thereon. The larva spins an irregular web amongst the grass, is very active, and wriggles to and fro along the leaves.

The pupa is slightly over $\frac{1}{4}$ inch in length; rather elongate with a very large and rugged cremaster; pale ochreous with the head and extremity slightly darker; there are two greyish-brown streaks on the wing-cases; a row of large black spots down the back and a similar row on each side, one spot being placed on each segment. The cremaster is horny, brownish-black, with blunt extremity and side process, both being furnished with several crooked bristles. The cocoon is constructed of fine white silk. It is attached to any firm object, is elliptical, very pointed at each end. The silk is thin and the black spots on the back and sides of the pupa can clearly be seen within the cocoon, the outline of the pupa being dimly visible. The whole appearance of the cocoon and the enclosed pupa is strongly suggestive of a large adherent grass seed and this is probably the object aimed at.

The perfect insect appears from September till April, so that there are apparently at least two broods in each season. It is sluggish in habit, seldom flying, but is usually seen walking or resting on leaves with its remarkable antennae fully displayed. The specimens occasionally observed in September and October are probably individuals belonging to the autumnal brood, which have remained in the pupa state during the winter. When in repose the wings are closed on each side of the body, forming a steep roof, the insect standing on all its legs, which are held close to the body. The thickened antennae are projected directly in front of the head, with the tips slightly divergent. In this position the insect has a considerable resemblance to a weevil (notably *Rhadinomus acuminatus*), the thickened portions of the antennae forming the rostrum and the divergent tips the antennae of the weevil.

PROTOSYNAEMA QUAESTUOSA.

(*Protosynaema quaestuosa*, Meyr., Trans. N.Z. Inst., lv., 205.)
(Plate L., fig. 13 ♂; Plate XXXIV., fig. 3 ♂ variety.)

This species has occurred at Kaeo, north of Auckland, Gollan's Valley near Wellington, on Mount Arthur, and on the lower slopes of Mount Aurum, near Lake Wakatipu, at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the costa slightly arched and the termen slightly oblique, very deep purplish-brown or deep yellowish-brown; there is a longitudinal creamy-white streak along the fold (sometimes absent), a very oblique purple-metallic bar from the costa at the base to the fold at about $\frac{1}{4}$; another curved bar near the middle reaching $\frac{1}{2}$ across the wing; three almost confluent black-edged pink metallic blotches from disc to tornus and a terminal series of similar blotches. The hind-wings are grey, much darker towards the termen. The antennae are thickened with grey scales from the base considerably beyond $\frac{1}{2}$.

Closely related to *P. steropucha* but distinguished by the naked apical portion of antennae, and rounded outline of terminal cilia of fore-wings. The scale-thickening of antennae is less strong and less extensive than in

P. steropucha. A very bright-coloured form occurs at Kaeo, north of Auckland, and is depicted on Plate XXXIV., fig. 3.

The larva, which feeds on *Carex Solandri*, and probably other native grasses, is about $\frac{1}{2}$ inch long; cylindrical, attenuated at each end, very much attenuated posteriorly. The head is pale green with several very fine brownish-black stripes; the body brilliant green with broad paler yellowish-green dorsal line; intersegmental spaces yellow, very conspicuous; two rows of minute black warts around each segment, each wart emitting a short black bristle; legs brownish ochreous.

The larva is generally sluggish, resting at full length on the leaves of its foodplant, where it is hard to see. When disturbed, however, it moves with great rapidity.

The cocoon is elongate-elliptical, with the ends long-pointed, pale brownish, the black spots on the enclosed pupa sometimes faintly visible through the texture of the cocoon. There is a distinct ridge along the top of the cocoon, and the larval skin is ejected through a slit at its posterior end, the skin usually remaining attached to the outside. In most cases this slit closes up so that the manner of the ejection of the cast larval skin from the cocoon is not apparent. The cocoon is usually attached to one of the leaves of the foodplant.

The perfect insect generally appears in February and March, and is found in open grassy glades amongst beech forest or sub-alpine scrub. An early brood was found, by Mr. Philpott, on Mount Arthur in November.

PROTOSYNAEMA ERATOPIIS.

(*Protosynaema eratopis*, Meyr., Trans. N.Z. Inst., xviii., 174.)

(Plate XXXIV., fig. 1 ♂.)

This very clearly-marked species has occurred at Mount Arthur, Castle Hill, and Otira River at elevations of from 2,000 to 3,000 feet above the sea-level. It is a very local insect, though usually abundant where found.

The expansion of the wings is about $\frac{1}{2}$ inch. The antennae in the male are clothed with dense scales from the base to $\frac{1}{2}$, in the female to $\frac{1}{4}$. The fore-wings are rather broad, oblong, with the termen slightly oblique; bright yellow-ochreous with the markings margined with brown; there is a curved white streak from the base, almost touching the dorsum at $\frac{1}{2}$, followed by a curved silvery band from the costa near the base to the dorsum beyond $\frac{1}{2}$; a broad curved white streak on the costa at $\frac{1}{2}$; two straight transverse bars cross the wing near the middle, the first thin, silvery in the middle; the second broader, clear white, almost throughout; a large, oval white, patch is situated in the disc beyond the middle traversed by six fine black lines; there is one short white mark and one silvery band on the costa near the apex; a large black tornal spot containing three coppery- or violet-metallic spots and a black spot nearer the disc containing one metallic spot. The hind-wings are grey.

The perfect insect appears in December and January and generally frequents sub-alpine scrub. It flies most freely in the hottest sunshine. When resting it stands very erect with the head slightly raised and the antennae extended forwards and upwards, each often alternately waved; the wings form a very steep roof. In this posture the insect is evidently very much on the

alert, and ready to take wing at the slightest alarm. As already pointed out by Mr. Meyrick the general resemblance of this species to a typical *Glyphipteryx* is very extraordinary, and this resemblance is most marked when the insect is resting.

Genus 5.—PHYLACODES, Meyr.

Antennae thickened with scales on basal half, basal joint without pecten. Fore-wings with vein 7 and 8 stalked. Hind-wings with 3 and 4 rather approximated.

An endemic genus represented by one species only.

PHYLACODES CAUTA.

(*Phylacodes cauta*, Meyr., Trans. Ent. Soc. Lond., 1905, 242.)

(Plate XXXIV., fig. 16.)

This very rare species was discovered by Mr. J. H. Lewis at Ida Valley, Central Otago.

The expansion of the wings is somewhat under $\frac{1}{2}$ inch. The antennae are densely scaled from near the base to considerably beyond the middle. The fore-wings are elongate with the costa abruptly arched near the middle and the termen slightly oblique; warm brownish-ochreous; there is a broad brown longitudinal central streak extending from the base to the termen; this streak is darkest on the fold and becomes fainter and wider towards the termen; there are one or two bluish or black discal dots beyond the middle and a few scattered brown dots. The hind-wings are greyish-brown, darkest near the apex.

Evidently very variable in the depth of the general colouring; in some specimens the central longitudinal streak is very faint and diffused and extends as far as the dorsum.

Genus 6.—CADMOGENES, Meyr.

Head with appressed scales, side-tufts somewhat raised; ocelli posterior; tongue developed. Antennae $\frac{3}{4}$, basal joint elongate, without pecten. Labial palpi long, recurved, second joint reaching base of antennae, thickened with appressed scales, terminal joint shorter than second, scaled, pointed. Maxillary palpi obsolete. Posterior tibiae smooth-scaled. Fore-wings vein 2 from angle, curved, 6-8 straight, slightly approximated towards base, 7 to costa, 9 and 10 somewhat approximated at base, 11 from middle. Hind-wings 1, elongate-oblong-ovate, cilia $\frac{3}{4}$; 2 from rather near angle, 3 from angle, 4 rather approximated to 3 towards base, 5 parallel, transverse vein inwards-oblique from 4 to 5, 6 and 7 rather approximated towards base. (Plate G., figs. 31, 32, 33 neurulation and head of *Cadmogences literata*.)

Belongs to group of *Orthenches*, from which genus it differs by terminal joint of labial palpi shorter than second, absence of maxillary palpi, and costal termination of vein 7 of forewings. This interesting form suggests some affinity with *Depressaria* and *Cryptolechia*, and may indicate the origin of the Oecophorides from the Plutellides, in which case it would be of high phylogenetic importance.

Only one species is known at present.

CADMOGENES LITERATA.

(*Cadmogences literata*, Meyr., Trans. N.Z. Inst. liv., 168.)

(Plate XLIX., fig. 11 ♂.)

This species has occurred at Kauri Gully and Takapuna, near Auckland, and at Silverstream Upper Hutt, near Wellington.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate-oval with the termen rather oblique, dull greyish-purple darker in the disc, irregularly mottled with red and with a few scattered dull orange scales; there is an elongate curved black-edged white mark placed obliquely before the middle of the disc and another much smaller one beyond the middle. The hind-wings, which have the apex rather pointed, are ochreous-grey.

The ground colour is rather variable. In some specimens the reddish mottling predominates, others are much greyer, whilst others again are somewhat bronzy.

The perfect insect appears in January.

Genus 7.—ORTHENCHES, Meyr.

Basal joint of antennae with pecten. Fore-wings with veins 7 and 8 separate. Hind-wings with 3 and 4 remote. (Plate H., figs. 42, 43, 44 neuration and head of *Orthenchus drosocalca*.)

Besides the eleven following species, there are at present known only one from Australia, and one from India. Of the New Zealand species two are restricted to the North Island; two to the South Island, and seven occur in both islands.

ORTHENCHES SALEUTA.

(*Orthenchus saleuta*, Meyr., Trans. N.Z. Inst., xlv., 28.)

(Plate XXXVI., fig. 3 ♀.)

This species has occurred at Waiohuru on the elevated central plains of the North Island; also on Mount Ruapehu, and Mount Egmont.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are elongate-oblong with the apex pointed and the termen obliquely-rounded; grey strewn with dark brown scales tending to form spots and bars, the spaces between these markings being more or less speckled with white, especially in the disc and towards the apex; the cilia are grey with coppery tips around the apex. The hind-wings and cilia are grey.

The perfect insect appears in February, and flies freely in the late afternoon sunshine. It swarms over the flowers of *Dracophyllum*.

ORTHENCHES CHARTULARIA.

(*Orthenchus chartularia*, Meyr., Trans. N.Z. Inst., lv., 205.)

(Plate L., fig. 25 ♂.)

This very pretty little species was discovered at Whakapapa, Mount Ruapehu, at an elevation of about 4,000 feet above sea-level.

The expansion of the wings is about $\frac{3}{8}$ inch. The fore-wings are snow-white mottled and spotted with black; there is a very broken chain of black blotches reaching from the base to the apex; numerous minute bars on the basal third of costa; four small blotches on costa beyond this; the apical terminal and basal areas are more or less densely strewn with blackish marks, the costal and dorsal areas being mostly white; the cilia are whitish mixed with blackish-grey. The hind-wings and cilia are white.

Variable in the extent and intensity of the black markings.

The perfect insect appears in January, and may be looked for in grassy glades in subalpine forest.

ORTHENCHES DROSOCHALCA.

(*Orthenchus drosocalca*, Meyr., Trans. Ent. Soc. Lond., 1905, 242.)

(Plate XXXVI., fig. 4 ♀.)

This brilliant little insect has occurred at Auckland, Wellington, Mount Arthur and the Otira River.

The expansion of the wings is about $\frac{3}{8}$ inch. The fore-wings are rather narrow with the costa slightly arched and the apex somewhat prominent; shining metallic copper colour becoming dull bronze in certain lights; there are four very irregular transverse bands of scattered silvery-white scales and the costal and terminal portions of the wings are also more or less strewn with patches of similar scales; there is a rather indistinct dark blue spot in the disc beyond the middle. The hind-wings are pale grey.

This species varies somewhat in size and in the brilliancy of the metallic ground colour of the fore-wings.

The larva, which feeds on the silvery tree fern (*Cyathea dealbata*) in January, is about $\frac{1}{4}$ inch in length, cylindrical tapering at each end with the segmental divisions deeply excised, uniform dark green and shining. The pupa is enclosed in a small oval cocoon fastened to a fern frond. Mr. Miller informs me that he has bred this insect from the fruit of the kahikatea. (*Podocarpus dactyloides*.)

The perfect insect appears from January till March. I have beaten it in some numbers out of young miro trees (*Podocarpus ferrugineus*) but, generally speaking, it is not a common species. When at rest the wings are closed over the back forming a cylinder; the fore- and intermediate legs are exposed and the antennae extended forwards and divergent. In this position the insect is evidently on the alert.

Mr. Meyrick points out that this species is allied to *O. porphyritis*, and similar in form of wing, but structurally distinct by vein 7 of the fore-wings running to termen, not apex, and terminal joint of palpi $1\frac{1}{2}$ instead of 2, as well as by the clear coppery-bronze colouring and lighter hind-wings.

ORTHENCHES PORPHYRITIS.

(*Orthenchus porphyritis*, Meyr., Trans. N.Z. Inst., xviii., 176; *Yponomeuta cuprea*, Meyr., Trans. Ent. Soc. Lond., 1901, 575.)

(Plate XXXVI., figs. 6 and 29 varieties.)

This mottled, bronzy-looking species has occurred at Auckland, Waimarino, Wellington, Arthur's Pass, Otira River, Dunedin and Invercargill, but does not seem to be generally common.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are elongate with the apex rather acute; pale brown with pale green and dull coppery metallic reflections; there are often three very irregular large white blotches in the disc, the first before the middle, the second near the middle and the third beyond the middle; there is a series of short dark brown bars on the costa and a number of blackish-brown dots on the dorsum and termen, there are also traces of black dots on some of the veins; in certain lights the dorsal half of the wing gleams with pale metallic green and the costal half with dull coppery-bronze. The hind-wings are dark greyish-brown with the tips very acute.

All the markings appear to be very variable and in some specimens the white discal blotches are replaced by pale brown; others are almost wholly coppery purple. A very beautiful variety from Mr. Clarke's collection is figured on Plate XLVII, fig. 17.

According to Mr. Meyrick the larva has 16 legs, is moderately stout, cylindrical, rather tapering at both ends; dull light greenish-ochreous; there is a narrow ochreous-whitish dorsal line bordered on each side by a slender dull reddish-brown streak, coalescing towards extremities; the head is brownish-ochreous. It feeds in December amongst loosely spun-together leaves of Totara (*Podocarpus totara*.) I have observed the larva in great abundance on the summit of Arthur's Pass (3,000 feet) feeding on *Phyllocladus alpinus*.

The pupa is enclosed in a thin cocoon.

The perfect insect appears from September till March and frequents open forest and scrub.

ORTHENCHES PRASINODES.

(*Orthenches prasinodes*, Meyr., Trans. N.Z. Inst., xviii., 176.)

(Plate XXXVI., fig. 5 ♀.)

This rather obscurely-marked species has occurred at Wainuiomata, near Wellington, and at Christchurch and Greymouth, but is apparently a very rare insect.

The expansion of the wings is $\frac{5}{8}$ inch. The fore-wings are rather elongate with the apex and tornus rounded; yellowish-brown with numerous obscure pale ochreous dots along the dorsum and some of the veins and very faint purplish reflections; there is a very indefinite dark brown transverse shading before the middle; a streak before the apex and several darker dots on the termen and dorsum. The hind-wings are very pale greyish-ochreous, almost white.

The perfect insect appears from December till March, and frequents forest.

ORTHENCHES SEMIFASCIATA.

(*Orthenches semifasciata*, Philp., Trans. N.Z. Inst., xlvii., 200;

Orthenches similis, Philp., ib. lv., 211.)

(Plate XL., fig. 3 ♀.)

This neatly-marked species has occurred at Kaitoke, near Wellington, in the North Island. In the South Island it has been taken on Mount Arthur at 3,500 feet, at Queenstown and at Hakapoua, Fiord County.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the costa strongly arched before the apex, whitish, mottled and spotted with greyish-brown; there is a number of short bars of variable size along the margins of the wing; an irregular patch in the disc before the middle and a larger patch beyond the middle; a large cloudy patch on the termen containing a broad oblique bar of the ground colour; there is a strong iridescent purplish sheen on the fold and below the apex; the cilia are whitish barred with greyish-brown. The hind-wings are greyish-ochreous.

The perfect insect appears in December and January, and may be looked for in open beech forests.

ORTHENCHES VINITINCTA.

(*Orthenches vinitincta*, Philp., Trans. N.Z. Inst., xlix., 244.)

(Plate XXXVIII., fig. 20 ♂.)

This very beautiful species was discovered by Mr. C. C. Fenwick at Rowallan, Waiapu, Southland.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which are rather elongate with the apex and tornus very much rounded, are glaucous green with black markings and warm reddish-brown mottling; there are three large irregular patches of reddish-brown on the dorsum and a very conspicuous almost round patch on the subterminal area; a series of small black marks on the costa; several irregular patches of blackish scales in the disc and a black spot on the inner edge of the reddish subterminal patch; all the reddish patches have purplish reflections and are sprinkled with a few purplish scales; the cilia are warm yellowish-brown strongly barred with reddish-brown; there are two conspicuous tufts of black cilia at the tornus. The hind-wings are pale ochreous; there are small tufts of black and reddish-brown cilia at the apex, the rest of the cilia being whitish-ochreous.

Varies considerably in depth of colour and distinctness of markings.

The perfect insect appears in December, and frequents coastal forest. Its colouring would evidently be highly protective on lichen-covered tree trunks.

Described and figured from the type specimen in the Fenwick collection.

ORTHENCHES POLITA.

(*Orthenches polita*, Philp., Trans. N.Z. Inst., l., 131.)

(Plate XLVI., fig. 4 ♀.)

This very handsome species was discovered by Mr. Philpott at Tisbury, near Invercargill.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings, which have the apex rather pointed and the termen very oblique, are golden-ochreous-brown with vivid pink reflections, especially at the base; there are three large white blotches in the disc at $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{2}{3}$, the middle blotch touching the dorsum, and two longitudinal deep blue stripes, one on the fold interrupted, the other much shorter above the fold. The hind-wings are pale greyish-white.

The perfect insect has been taken in February and July.

Described and figured from the type specimen kindly lent to me by Mr. Philpott.

ORTHENCHES CHLOROCOMA.

(*Orthenches chlorocoma*, Meyr., Trans. N.Z. Inst., xviii., 175.)

(Plate XXXVIII., fig. 19.)

This rather dull-looking species has occurred at Auckland, on the hills around the French Pass near Nelson, and at Christchurch.

The expansion of the wings is about $\frac{5}{8}$ inch. The fore-wings are elongate-oblong with the apex and tornus very rounded, dull greyish-ochreous very slightly tinged with greenish; there is a conspicuous black spot on the fold at about $\frac{1}{3}$ and a fainter mark beyond this; another conspicuous black spot in the disc at about $\frac{2}{3}$; there is a chain of minute black marks on all the margins of the wing; the veins are very faintly marked in grey, the cilia are greyish-ochreous tinged with greenish and faintly barred with blackish. The hind-wings and cilia are pale whitish-ochreous; the cilia have a dark tuft near the apex.

The larva, which feeds on the native broom (*Carmichaelia*), is about $\frac{1}{2}$ inch in length, considerably flattened, strongly tapering posteriorly. The head is brownish-yellow marbled with blackish-brown; the body bright green; the second segment is edged with pink; there is a broad white lateral line; segments 2, 3 and 4 have a single row of conspicuous black warts; the

other segments have two rows of minute black warts, with whitish dots between them, each of the black dots emits a short black bristle; there is often a faint broken whitish subdorsal line. The anal prolegs and posterior portions of the larva are usually tinged with pink.

This larva is very active when disturbed, otherwise it usually rests at full length on the leafless stalks of its foodplant. It is a very pretty-looking larva, its bright green colour, broad white lateral line and clear black dots giving it a very striking appearance for so small a caterpillar.

The pupa is enclosed in a rather open network cocoon, attached to the stem of the foodplant.

The perfect insect appears in February.

ORTHENCHES GLYPHARCHA.

(*Orthenches glypharcha*, Meyr., Trans. N.Z. Inst., li., 353.)

(Plate XLVII., fig. 19 ♀.)

This extremely beautiful little species has occurred in the forest on the lower slopes of Mount Egmont and Mount Ruapehu at elevations of about 3,600 feet above sea-level. It has also been found in the Motueka Valley, near Nelson, and at Christchurch and Arthur's Pass.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings, which are elongate-oblong with the termen strongly oblique, are deep bronzy-grey with brilliant golden reflections and dark-edged shining snow-white markings; there is a short longitudinal white bar in the middle at the base; a large outwards-curved crescentic mark on the costa at about $\frac{1}{3}$, reaching beyond the disc; another much shorter mark near the middle; a small broad mark beyond this and two slightly longer marks before the apex; there are several small white blotches on the termen, one almost connected with the sub-apical costal mark, also a large club-shaped mark at the tornus reaching more than half-way across the wing. The hind-wings and the cilia of all the wings are grey. The head is shining white, grey on the crown; the thorax white with bronzy-golden side tufts and the abdomen grey. The antennae are snow-white with black rings.

The perfect insect appears in February, and evidently frequents forests. It is fairly common on Mount Egmont. The markings on the fore-wings of this species are suggestive of certain members of the genus *Glyphipteryx*.

ORTHENCHES VIRGATA.

(*Orthenches virgata*, Philp., Trans. N.Z. Inst., lli., 44.)

(Plate XLVII., fig. 18 ♀.)

This bright-looking species was discovered by Dr. A. Jefferys Turner at Auckland. It has also occurred at Waitati, near Dunedin.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are bright fawn-colour with purplish reflections; there are four darker oblique transverse bands; the first near the base, from the fold to the dorsum; the second, containing a distinct black mark, from $\frac{1}{3}$ of the costa to the middle of the dorsum; the third from about $\frac{1}{2}$ of the costa to near the tornus; the fourth from before the apex to near the tornus, where it meets the third band, the two forming a large irregular V-shaped marking; there is a short black bar on each side of the V and a whitish cloud towards the termen. The hind-wings, cilia and abdomen are pale cream colour.

The perfect insect appears in October.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

Genus 8.—PLUTELLA, Schranck.

Basal joint of antennae with dense pecten. Labial palpi with second joint tufted beneath. Fore-wings with veins 7 and 8 separate. Hind-wings with 3 and 4 connate or somewhat approximated. (Plate H., figs. 33, 34, 35 neuration and head of *Plutella maculipennis*.)

A small cosmopolitan genus represented in New Zealand by five species.

PLUTELLA MEGALYNTA.

(*Plutella megalynta*, Meyr., Trans. N.Z. Inst., xlvii., 203.)

(Plate XXXVI., fig. 1.)

This very large species has occurred on the Hunter Mountains in Southland at elevations of between 3,000 and 4,000 feet above the sea-level, on McKinnon Pass, and on Table Hill Stewart Island, at about 2,000 feet.

The expansion of the wings is $1\frac{1}{2}$ inches. The fore-wings are elongate with the costa arched and the apex somewhat obtuse; pale brownish-ochreous with brown markings; there is a narrow longitudinal streak near the costa on the basal third; another shorter and thicker streak beyond this in the disc; a triangular patch on the termen below the apex with its pointed end turned upwards; there is a broad longitudinal stripe from the base parallel to the dorsum reaching nearly to the tornus; a cloudy patch of reddish-brown in the disc beyond the middle and four black dots on the apical third of the costa. The hind-wings are pale straw-colour. The body is brownish-ochreous; there are two black bars on the thorax.

There is considerable variation in size, some specimens having a wing expanse of fully $1\frac{1}{2}$ inches. Also in the ground colour, which is sometimes more or less clouded with dull brown.

The perfect insect appears in December. Mr. Philpott informs me that drowned specimens are often found in the mountain tarns, although living individuals are rarely met with.

This species may be at once recognised by its large size and very distinct and unusual markings.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

PLUTELLA SERA.

(*Plutella sera*, Meyr., Trans. N.Z. Inst., xviii., 178.)

(Plate XXXVI., fig. 9 ♂.)

This speckled little insect seems to be generally distributed throughout the North Island, though nowhere abundant. In the South Island it has occurred at Christchurch.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The antennae are whitish-ochreous with two bars and the apex dark brown. The fore-wings are rather broad with the costa slightly arched and the termen oblique; pale brownish-ochreous, sometimes dark brownish-ochreous, with numerous blackish-brown spots; there is a cloudy brown shading at the base; a large black spot on the fold before the middle, tending to be produced as a cloudy streak towards the costa; another faint streak on the dorsum at $\frac{1}{3}$; a marginal series of blackish spots and a few scattered black dots in the disc. The hind-wings are pale greyish-ochreous.

The perfect insect appears from December till March. Mr. Meyrick states that it is common in Eastern Australia, where the imago is on the wing most of the year, frequenting the neighbourhood of cultivation. It is also found in India and most probably was originally introduced into New Zealand by artificial means. When at rest it stands on the tips of its tarsi with the fore-part raised and the wings touching the ground; the antennae are extended forwards, almost straight and slightly divergent.

PLUTELLA ANTIPHONA.

(*Plutella antiphona*, Meyr., Trans. Ent. Soc. Lond., 1901, 576.)

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate, rather narrow, long-pointed; pale whitish-ochreous with longitudinal rows of small ochreous spots; dorsal half wholly fuscous mixed with blackish, upper edge somewhat irregular, running from base of costa to apex of wing; cilia ochreous-whitish, on costa spotted with brownish irroration, on termen brownish-suffused, with blackish line. Hind-wings with veins 5 and 6 stalked; grey; cilia light greyish-ochreous.

I am unable to trace any specimen of this species in any collection in the Dominion. The above is abridged from Mr. Meyrick's original description, made from a single specimen, taken at Wellington about thirty years ago, and apparently not since met with.

PLUTELLA PSAMMOCHROA.

(*Plutella psammochroa*, Meyr., Trans. N.Z. Inst., xviii., 179.)

(Plate XXXVI., fig. 10 ♂.)

This rather dull-coloured species has occurred at the Otira River and on Ben Lomond, Lake Wakatipu, at an altitude of about 2,000 feet.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate oblong with the apex acute and the termen obliquely-concave; pale ochreous-brown and glossy; there are four very small blackish marks in the fold, near the middle; one or two thicker marks before the tornus and several scattered minute black dots in the disc; the veins near the termen are faintly marked with greyish-ochreous. The hind-wings are very pale whitish-ochreous.

The perfect insect appears from November till January, and frequents open country on the mountain side.

This species is also found in Eastern Australia.

Described and figured from a specimen in the Fereday collection.

PLUTELLA MACULIPENNIS.

(*Plutella maculipennis*, Curt. Brit. Ent. pl. cccxx.; *Plutella cruciferarum*, Z.; Meyr., Trans. N.Z. Inst., xviii., 177.)

(Plate XXXVI., fig. 8 ♂, 7 ♀.)

This destructive insect appears to be very common and generally distributed in gardens throughout the country. It is especially abundant in the Nelson District. It has also occurred on Enderby Island in the Auckland Islands.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The antennae are ringed with black near the middle and apex. The fore-wings are rather narrow, with the apex acute in the male, and the termen oblique; brown often purplish-tinged, paler in female; the male has a broad cream-coloured dorsal streak from

base to near tornus, often edged with black towards disc; in the female this stripe is much less distinct and often merged in the general ground colour; there is a series of indistinct black dots below the costa and another series on the dorsum. The hind-wings are grey.

There is much variation in the depth of the colouring of the fore-wings in both sexes. In the female the paler dorsal streak is frequently almost interrupted by large rounded projections from the darker discal area. Other specimens are much suffused with ochreous-brown.

The larva is green, feeding on cabbages and other *Cruciferae*, to which it is often very destructive, eating the leaves into numerous small holes.

The pupa is enclosed in an open network cocoon, usually attached to the under-surface of a leaf.

The perfect insect appears from August till April, being commonest during the late summer and autumn. It is now found almost throughout the world and its wide distribution is probably largely due to human agency. When at rest the antennae are held in contact straight out in front, the fore- and intermediate legs extended and the wings closed along the sides of the body. The peculiar position of the antennae, which are conspicuous, give the insect a very unreal appearance.

Genus 9.—CIRCOXENA, Meyr.

Head smooth, rounded; ocelli distinct; tongue developed. Antennae $\frac{3}{4}$, basal joint very long, slender, thickened towards apex, with slight pecten. Labial palpi very long, slender, recurved, terminal joint longer than second, acute. Maxillary palpi very short, filiform, porrected. Posterior tibiae with rough projecting hair-scales above. Forewings with vein 1b apparently simple, 2 from $\frac{1}{2}$, 3 from angle, 3-5 somewhat approximated at base, 7 and 8 long-stalked, 7 to costa, 9 and 10 rather approximated to 8 at base, 11 from middle. Hind-wings under 1, lanceolate, cilia $1\frac{1}{2}$; 3 and 4 connate, 5 and 6 stalked, 7 parallel. (Plate A., figs. 7, 8 and 9 neuration and head of *Circoxena ditrocha*.)

A singular form, structurally nearest to *Acrolepia*, but quite peculiar in appearance, and very interesting. Represented by a single endemic species.

CIRCOXENA DITROCHA.

(*Circoxena ditrocha*, Meyr., Trans. N.Z. Inst., xviii., 419.)

(Plate XXVIII., fig. 19.)

This beautiful and very distinctly-marked little species has occurred at Auckland, several localities around Wellington and at Dunedin.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are narrow, elliptical with the apex acute; brownish-ochreous with golden reflections; the dorsum is shaded with dark brownish-black and, except on the basal third, the entire wing is broadly streaked with dark brownish-black, only patches of the ochreous ground colour remaining visible; there are two large clear white fine ring-shaped markings, the first slightly before the middle, the second a little beyond the middle, the two being connected by indistinct white markings; in some specimens the entire central area of the fore-wings, outside the two ring-like marks, is clouded with white, thus making the dark colouring inside the rings very conspicuous; the cilia are pale brownish-ochreous mixed with blackish. The hind-wings, which

are narrow with the apex very acute, are greyish-ochreous with the cilia also greyish-ochreous.

The perfect insect appears in December and March, frequenting the edges of forest or scrub. It is of sluggish habit and is usually obtained by sweeping foliage, especially *Nothopanax arboreum*, to which it appears attached. When resting it stands on the fore- and intermediate-legs; the hind-legs, body and wings are elevated at an angle of about fifteen degrees, and the antennae placed backwards, with the tips curved slightly outwards.

Sub-family 14.—LYONETIADÆ.

Head usually tufted on crown, sometimes smooth. Antennae with basal joint often forming an eyecap. Labial palpi porrected or subsacceding, more or less obtuse. Maxillary palpi usually long, folded. Forewings with apex bent up or down. Hind-wings lanceolate or ovate-lanceolate. (Plate K, figs. 4-12 and 22-27.)

A considerable sub-family, generally distributed. It is represented in New Zealand by the following eleven genera:—

- | | |
|------------------|----------------|
| 1. BEDELLIA. | 6. ERECHTHIAS. |
| 2. CATERISTIS. | 7. HECTACMA. |
| 3. OPOGONA. | 8. TEPHROSARA. |
| 4. AMPHIXYSTIS. | 9. PETASACTIS. |
| 5. EUGENNAEA. | 10. DRYADAULA. |
| 11. ESCHATOTYPA. | |

Genus 1.—BEDELLIA, Stt.

Head rough on crown, face smooth. Basal joint of antennae rather stout, with large dense pecten. Labial palpi short, porrected. Maxillary palpi rudimentary. Forewings with veins 4 and 5 absent. Hind-wings linear-lanceolate; 3 and 4 absent.

A small genus of scattered species, of which two occur in New Zealand.

BEDELLIA SOMNULENTILLA.

(*Bedellia somnulentilla*, Zell., Isis 1847, 894; Meyr., Trans. N.Z. Inst., xxi., 164.)

This species has occurred in Taranaki, at Wellington, and at Dunedin.

The expansion of the wings is about $\frac{3}{4}$ inch. Head whitish-ochreous, somewhat mixed with fuscous. Thorax whitish-ochreous, in front fuscous. Fore-wings lanceolate; vein 3 absent, 6 out of 8; pale greyish-ochreous, suffusedly irrorated with fuscous except on a streak along dorsum: cilia light ochreous-grey, on costa ochreous-whitish. Hind-wings grey; cilia light ochreous-grey.

Larva mining blotches in leaves of *Convolvulus* and *Ipomoea*; pupa naked, suspended; bred freely from the larva by Mr. A. Purdie. Occurs usually from September to November. Probably an introduced species, found in Europe, North America, and throughout Australia.

The above is copied from the original description.

BEDELLIA PSAMMINELLA.

(*Bedellia psamminella*, Meyr., Trans. N.Z. Inst., xxi., 165.)

This species was taken commonly by Mr. Meyrick, in the early '80's, at Taranaki, Christchurch and Dunedin, but does not appear to have been detected by later collectors.

The expansion of the wings is about $\frac{3}{4}$ inch. Head light ochreous, crown mixed with dark fuscous. Palpi fuscous. Antennae fuscous-whitish. Thorax and abdomen pale ochreous. Legs whitish-ochreous, anterior and middle pair infuscated. Fore-wings lanceolate; vein 3 present, 6 absent; pale brownish-ochreous, with a few minute black irrorations towards costa posteriorly; a small black dot on inner margin at $\frac{1}{2}$ of wing; cilia pale brownish-ochreous. Hind-wings light grey; cilia pale ochreous-grey.

The perfect insect appears in September and from December till February.

I am unacquainted with this species. The above is taken from the original description.

Genus 2.—CATERISTIS, Meyr.

Head rough on crown, face smooth. Basal joint of antennae enlarged, with dense pecten forming an eyecap. Labial palpi short, drooping. Maxillary palpi rudimentary. Fore-wings with veins 3 and 4 absent, 9 absent. Hind-wings lanceolate; 3 and 4 absent.

Contains only the following species.

CATERISTIS EUSTYLA.

(*Cateristis eustyla*, Meyr., Trans. N.Z. Inst., xxi., 164.)

A single specimen of this species was taken by Mr. Meyrick at Christchurch.

The expansion of the wings of the male is nearly $\frac{1}{2}$ inch. Head and thorax white, face grey. Palpi dark fuscous. Antennae whitish-grey. Abdomen grey. Legs dark grey, tarsi ringed with white, middle and posterior tibiae grey-whitish. Fore-wings lanceolate; snow-white; costa slenderly dark fuscous from about $\frac{1}{4}$ to $\frac{3}{4}$; cilia light grey, towards base whiter, round apex wholly white or ochreous-white, with a grey dot. Hind-wings and cilia light grey.

The perfect insect appears in December, frequenting forest. This species also occurs in Tasmania, specimens from that country being absolutely similar to the New Zealand insect.

I am unacquainted with this species. The above is taken from the original description.

Genus 3.—OPOGONA, Zell.

Head smooth, with raised fillet between antennae. Basal joint of antennae very long, flattened, concave beneath. Labial palpi moderately long, porrected, diverging. Maxillary palpi long, folded. Fore-wings with veins 6-8 stalked. Hind-wings lanceolate.

A considerable genus, widely distributed in warm regions. The larvae feed on dry vegetable matter. We have two species, both probably artificial introductions.

OPOGONA OMOSCOPA.

(*Hieroxestis omoscopa*, Meyr., Proc. Linn. Soc. N.S.W., 1892, 567; Trans. N.Z. Inst., xli., 113.)

(Plate XXXVI., fig. 11 ♂, 12 ♀.)

This species has occurred in the Auckland and Thames districts, but does not appear to be generally distributed.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings, which have the apex pointed and the termen extremely oblique, are pale ochreous-brown in the male with faint brassy reflections; there are usually patches of dark brown scales on the dorsum near the base and along the fold. In the female the

fore-wings are dark blackish-brown, with faint purplish reflections, irregularly sprinkled with golden ochreous scales. The hind-wings in both sexes are very pointed bright ochreous tinged with grey towards the apex.

The perfect insect appears in January. It has been taken at sugar in cultivated localities, and is no doubt semi-domestic in its habits. According to Mr. Meyrick it occurs also in Australia and South Africa, the latter country being apparently its home. It has been bred from cork, with which it is probably introduced.

OPOGONA COMPTELLA.

(*Opogona comptella*, Walk., Cat. xxx., 1007; Meyr., Proc. Linn.

Soc. N.S.W., 1897, 416.)

(Plate XXXIV., fig. 17 ♀.)

This handsome Australian species was discovered by Mr. R. M. Sunley at Nelson. It has also occurred fairly commonly at Pieton, and more recently on the Raurimu Spiral.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which are very pointed, are bright yellow with very dark brown markings; there is a small basal patch; a narrow costal border from the base to $\frac{1}{2}$; the apical half of the wing is dark brown except a large patch of yellow before the apex and a smaller patch near the tornus. The hind-wings are orange-brown, darker towards the apex.

The perfect insect appears in February.

Mr. Meyrick informs us that "its larval habits are unknown, but the larvae of other species of the genus feed in dead woody fibre, in such varied situations as the stems of plants and the nests of Termites (white ants)."

Genus 4.—AMPHIXYSTIS, Meyr.

Head smooth, a raised frontal fillet, behind it a thin ridge of erect hairs, face very retreating; tongue obsolete. Antennae nearly 1, scape (basal joint) moderate, swollen, without pecten. Labial palpi moderate, slender, smooth, second joint curved, subascending, terminal joint shorter, porrected, obtuse. Maxillary palpi long, several jointed, folded, filiform. Posterior tibiae with long hairs above. Fore-wings with apex down-turned, vein 1b simple, 2 from beyond $\frac{1}{2}$, 3 from five-sixths, 4 and 5 connate from angle, 6 and 7 stalked, 7 to costa, 8 almost connate with 6, 9 approximated, 10 from $\frac{1}{2}$, 11 from middle. Hind-wings three-fifths, narrow-lanceolate, cilia 3; 2-4 remote, parallel, 5 and 6 connate from apex of cell, 7 closely approximated at base. (Plate K., figs. 10, 11, 12 neuration and head of *Amphixystis hapsimacha*.)

Represented by one endemic species only.

AMPHIXYSTIS HAPSIMACHA.

(*Amphixystis hapsimacha*, Meyr., Trans. Ent. Soc. Lond., 1901, 577.)

(Plate XXXVI., fig. 24 ♂, 25 ♀.)

This obscure but interesting insect is very abundant at Kaeo north of Auckland, and is fairly common in the neighbourhood of Wellington. It has also occurred at Auckland and Waimarino and in the South Island at Christchurch.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch, of the female $\frac{1}{2}$ inch. The fore-wings are elongate, very narrow, with the costa almost straight, the apex acute and the

termen extremely oblique; glossy ochreous-brown; there are three very faint brown streaks converging at the apex; the costal streak starts at about $\frac{1}{2}$, the discal almost from the base, and the dorsal from before the middle; there is a cloudy patch of brown scales on the dorsum before the middle, followed by a series of dark brown scales; a V-shaped dark brown mark is situated at the apex; all these markings vary considerably in distinctness, and the ground colour in depth. The hind-wings are greyish-ochreous, with golden reflections.

The perfect insect appears from November till February, and frequents the dead leaves of tree-ferns, cabbage trees and Nikau Palms and *Astelias* in the densest forests. It rests with the wings closed tightly over the back and held flat, so that the insect appears as an elongate ellipse. The antennae are placed backwards along the edges of the wings; the tips of the intermediate and posterior tarsi are visible; the anterior tarsi are placed forwards on each side of the head. When disturbed the insect runs with great rapidity. It also flies fast and is then exceedingly difficult to see. When in repose the entire insect closely resembles a small elongate seed-case or a minute fragment of dried leaf or bark.

Genus 5.—EUGENNAEA, Meyr.

Head rough. Basal joint of antennae somewhat dilated. Labial palpi moderately long, porrected, second joint with projecting scales beneath towards apex, terminal joint shorter than second, loosely scaled, somewhat pointed. Maxillary palpi long, folded, filiform. Posterior tibiae clothed with hairs. Forewings with vein 4 absent, 6 almost to apex, 7 absent. Hind-wings elongate-ovate; 2-4 parallel, 5 and 6 stalked, 6 to termen, 7 parallel.

Differs from *Decadarchis* by 6 of hind-wings running to termen.

An endemic genus represented by one species.

EUGENNAEA LAQUEARIA.

(*Decadarchis laquearia*, Meyr., Trans. N.Z. Inst., xlvii., 113.)

(Plate XXXVI., fig. 15 ♀.)

This very beautiful and remarkable-looking species has occurred at Kaeo, north of Auckland, at Porirua, and at Wellington.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are rather broad with the termen almost straight and the apical projection slightly developed; the basal third is blackish-grey, crossed by several obscure darker transverse lines; the rest of the wing is creamy-white broken up by several interrupted blackish-grey stripes; the termen is blackish-grey tinged with vivid purple and the apex is bright coppery-red; the apical cilia are white barred with black with an elongated apical tuft; the terminal cilia are grey with purplish reflections. The hind-wings, which have the apex strongly produced, are rich golden-brown paler towards the base; the labial palpi are shining white.

This species is apparently very variable. Two striking forms occur hitherto found attached to *Astelia solandri*. The first has the fore-wings dark brownish-grey with oblique black bars on the costa and four short oblique white bars before the apex; there is an irregular black and white marking at the tornus; two black-edged whitish marks on the dorsum near the base and one similar mark in the disc. The other form is much paler with the fore-wings cream-coloured with fine grey costal bars, dull

*Trans. N.Z. Inst., xliii., 69.

steely-blue markings on the termen and dorsum and very pale grey hind-wings. All forms, however, agree in having the cilia of the fore-wings tinged with coppery-red below the apex and two black apical tufts.

The perfect insect appears in January and February, but is very rarely met with. It is most likely to be discovered by sweeping. The typical form seems to be attached to the Nikau Palm (*Rhopalostylis sapida*). In its markings and general appearance this insect strongly suggests certain species of *Glyphipteryx*.

Genus 6.—ERECHTHIAS, Meyr.

Head rough. Basal joint of antennae moderate. Labial palpi moderately long, more or less loosely scaled. Maxillary palpi long, folded. Fore-wings with vein 4 absent, 7 separate or stalked with 8. Hindwings lanceolate or ovate-lanceolate; 5 and 6 stalked, 6 to costa. (Plate K., figs. 4, 5, 6 nervation and head of *Erechthias externella*.)

A genus of some extent, most developed in the Indo-Malayan and Australian regions. I regret when restricting the genus *Erechthias* to have misapplied the name to the following genus, overlooking the fact that the neural characters originally assigned to it only agree with this one. For this genus I have hitherto used the name *Ereunetis*, but I now consider that *Ereunetis* (type *uloptera* Meyr.) must be maintained as a distinct genus, characterized by having the cell of hind-wings open between veins 3 and 4, and not represented in New Zealand. *Decadarchis* also does not occur in New Zealand. (Meyrick.)

The eleven species included in this interesting genus, as well as those included in the allied genera, *Eugennaea* and *Hectacma*, are all very distinctly-marked insects and present little difficulty in their correct identification. The apex of the fore-wing is, in the living insect, bent over so that when the wings are closed there is a small projection or lappet on each side of the posterior extremity. On this lappet there is frequently an eye-like mark and also a dash, suggestive of a real eye and the basal portion of an antenna, the tips of the lappets standing for palpi. In addition to this unusual modification, the real head and thorax are very narrow so that the anterior portion of the insect tapers almost to a point. I think there is little doubt that this is an instance of protection by a "false head," the lappets, with their eye-like marks, conveying the idea of a head and thus inducing an enemy to seize the fragile structure, the captive of course immediately breaking away and sustaining but a trivial injury. The habit which these insects have of resting with the head downwards further adds to the deception. Such special modifications are well-known in the case of many butterflies, but it is interesting to find a parallel case amongst the smaller Lepidoptera.

Of the eleven species of *Erechthias* found in New Zealand six are restricted to the North Island; one to the South Island, and four occur in both islands.

ERECHTHIAS EXTERNELLA.

(*Glyphipteryx externella*, Walk., Cat. xxx., 841; *Decadarchis monastra*, Meyr., Trans. N.Z. Inst., xxiii., 100; *Erechthias erebistis* ib. xxiv., 220.)

(Plate XXXVI., fig. 14 ♂; fig. 13 ♀.)

This small, very dark-looking species is fairly common in the neighbourhood of Wellington.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the costa slightly arched and the tornus rounded; very deep purplish-black with coppery reflections; there are two indistinct darker transverse bands; a coppery crescentic mark near the apex, enclosing a paler, black-centred, eye-like spot which occupies the whole of the apical lappet; the entire wing is also irregularly strewn with bluish-white scales. The hind-wings are warm brown, thickly speckled with black and with a black spot on the pointed apex. In the female the general colour of the fore-wings is considerably paler and browner; there is a very conspicuous ochreous-whitish patch on the costa beyond the middle and a smaller patch of the same colour near the dorsum at about $\frac{1}{4}$.

The perfect insect appears in October and frequents scrub. It flies rapidly between 2 and 5 p.m., in the afternoon sunshine, and at such times its movements are extremely hard to follow.

ERECHTHIAS LYCHNOPA.

(*Erechthias lychnopa*, Meyr., Trans. N.Z. Inst., lvii., 702.)

(Plate XL., fig. 8 ♂.)

This species has occurred in wind-swept scrub, near Sinclair Head, Wellington.

The expansion of the wings is about $\frac{5}{8}$ inch. The fore-wings are elongate-elliptical with the apex turned upwards; black heavily sprinkled with bluish-white scales, paler near base (perhaps due to erosion); there is a large orange-brown apical patch containing a conspicuous eye-like black spot sprinkled with bluish-white scales; the cilia are black with conspicuous white line and apical tuft. The hind-wings are rich bronzy-brown with small eye-like mark at apex, obscurely margined with orange-brown; the cilia are black, with whitish line at apex and a distinct apical tuft.

Very like *E. externella*, but much larger than that species.

The perfect insect appears in November. It is apparently a very rare insect confined to very exposed situations where it should be looked for in calm, fine weather!

ERECHTHIAS ACRODINA.

(*Ereunetis acrodina*, Meyr., Trans. N.Z. Inst., xlv., 122.)

(Plate XXXVI., fig. 19 ♀.)

This rather obscurely-marked species has occurred at Wellington, but is rather rare. It has also been found at Christchurch, Dunedin and the Bluff.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate with the costa moderately arched and the termen very obliquely rounded; pale brown; there is a very broad, cloudy, longitudinal blackish band from the base to the apex, terminating in a very distinct black spot on the lappet; the costal area is irregularly clouded with black with the exception of a clear oval pale brown patch near the middle and a wedge-shaped patch before the apex. The hind-wings are whitish-ochreous with a small tuft of blackish-brown cilia at the apex.

Superficially this insect very closely resembles *Erechthias fulgaritella*, but may be distinguished from that spe-

cies by the oval pale brown patch near the costa, and the absence of any well-defined projections from the dorsal edge of the central streak.

The perfect insect appears in November and December, and frequents forest. Mr. Philpott has found it commonly on dead *Leptospermum*.

ERECHTHIAS CHARADROTA.

(*Erechthias charadrota*, Meyr., Proc. Linn. Soc. N.S.W., 1880, 268.)

(Plate XXXVI., fig. 16 ♂.)

This very distinct species is common in the neighbourhood of Wellington and has also been found at Auckland, Taranaki, Lyttelton, Christchurch and Invercargill.

The expansion of the wings varies from slightly under to considerably over $\frac{1}{2}$ inch. The fore-wings are pale ochreous-yellow with the costa and dorsum broadly bordered with dark brown; the costal border is obliquely broken near the middle and is clouded on its inner edge with warm reddish-brown; there is a reddish-brown spot at the apex, preceded by an oblique metallic mark on the fold of the lappet. The hind-wings are pale brownish-grey.

The perfect insect appears from October till February, and frequents forest. There are certainly two broods in the season.

ERECHTHIAS MELANOTRICHA.

(*Erechthias melanotricha*, Meyr., Trans. N.Z. Inst., 1887, 93.)

Two specimens of this species were captured by Mr. Meyrick at Whangarei and Auckland respectively.

It is stated to only differ from *Erechthias charadrota* in having the face and forehead wholly blackish.

The perfect insect appears in December.

ERECHTHIAS TERMINELLA.

(*Cerostoma terminella*, Walk., Cat. xxviii., 548; *Elachista subpavonella*, ibid., xxx., 898; Meyr., Proc. Linn. Soc. N.S.W. 1880, 269.)

(Plate XXXIII., fig. 21 ♂.)

This very distinctly-marked species has occurred at Auckland, Taranaki, and Paraparaumu and Paekakariki, near Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The head and thorax are white, the anterior margin of latter sharply dark brown. The fore-wings are blackish-brown; there is a straight central longitudinal creamy-white streak from base to termen below apex, becoming rather broader towards apex, its lower margin rather irregular; two oblique white streaks from costa, the first near middle joining the central streak; the second midway between the first and apex, shorter and less distinct; the cilia are white containing a blackish ovate apical spot. The hind-wings are pale grey.

The perfect insect appears in January, and frequents forest.

Described and figured from a specimen kindly lent to me by Mr. Clarke.

ERECHTHIAS EXOSPILA.

(*Ereunetis exospila*, Meyr., Trans. Ent. Soc. Lond., 1901, 577.)

(Plate XXXVI., fig. 22 ♀.)

This very fragile-looking species has occurred at Kaeo and Whangarei in the North Auckland district, and at Auckland.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are very narrow, elliptical, with the apex acutely pointed; very pale brownish-ochreous with blackish-grey markings; there is a broad, cloudy, longitudinal streak, near the dorsum, from the base to the apex and three narrow curved streaks from the outer half of the costa joining this; there is a very conspicuous black spot at the apex. The hind-wings are pale grey with the apical cilia tipped with blackish.

The perfect insect appears in December and January, and inhabits forest.

ERECHTHIAS INDICANS.

(*Erechthias indicans*, Meyr., Trans. N.Z. Inst., Iv. 168.)

(Plate XLIV., fig. 33 ♀.)

This very distinctly-marked little species has occurred at Karori, near Wellington.

The expansion of the wings is slightly over five-sixteenths of an inch. The fore-wings are elongate-elliptical, creamy-white; there is a broad brown streak along the dorsum and termen from base to apex; a curved streak from the costa at base meeting the dorsal streak at about $\frac{2}{3}$ and another curved streak from the costa beyond middle to apex; the apical third of costa is margined with brown; there is a very conspicuous black apical spot. The hind-wings are very acutely pointed, triangular, pale ochreous. The head and thorax are white with broad golden-brown bands on the sides.

The perfect insect appears in January.

ERECHTHIAS HEMICLISTRA.

(*Decadarchis hemiclistra*, Meyr., Trans. N.Z. Inst., xliii. 77.)

(Plate XXXVI., fig. 21 ♀; Plate III., fig. 36 larva; fig. 37 pupa.)

This large and neatly-marked species has occurred at Waimarino, Wellington and Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are very pale brownish-white with dark blackish-brown markings; there is an elongate wedge-shaped mark along the costa from the base to $\frac{1}{2}$; a fine line from the disc at about $\frac{2}{3}$ to the apex; a rather indistinct streak on the fold and conspicuous oval spot at the apex. The hind-wings are very pale greyish-white, faintly clouded with brown towards the apex.

The larva, according to Mr. Sunley, feeds in the dead flower stems of *Arundo conspicua* (toe toe grass). Its length, when full-grown, is slightly over $\frac{1}{2}$ inch, very elongate tapering posteriorly and much flattened above; general colour ochreous with a brown dorsal stripe, indicating the position of the alimentary canal; the head is reddish-brown and very shining; the second segment dull brown and semi-transparent; there is whitish raised lateral ridge and similar intersegmental ridges; the legs and prolegs are very small, ochreous-brown and the whole larva is sparingly clothed with long bristles.

The pupa is about $\frac{1}{4}$ inch long, elongate, pale brown, darker on the back; the very prominent eye-case and thoracic shield are dark blackish-brown and shining; the antennae extend to the end of the body and the wing-cases are pale ochreous.

The perfect insect appears early in September and is met with as late as February, but is not a common species. I have found it more frequently in the house than out in the open. Mr. Clarke states it is attached to *Cordyline indivisa*.

ERECHTHIAS FULGURITELLA.

(Cerotoma fulguritella, Walk., Cat. xxviii., 548.)

(Plate XXXVI., fig. 20 ♀.)

This rather obscurely-marked species has occurred at Wellington, Christchurch, Dunedin, Lake Wakatipu, and Invercargill, but is rarely met with.

The expansion of the wings varies from about $\frac{1}{2}$ to $\frac{3}{4}$ inch. The fore-wings are pale brownish-ochreous with the costal area more or less clouded with darker brown; there are several cloudy blackish streaks in the disc, extending from the base to the apex, the lowest of these emitting three blunt projections towards the dorsum; the dorsal area is very pale brownish-ochreous, often almost white; there is a black spot at the apex. The hind-wings are very pale greyish-brown, darker towards the apex.

The perfect insect appears from November till February and frequents forest or scrub.

ERECHTHIAS MACROZYGA.

(Erechthias macrozyga, Meyr., Trans. N.Z. Inst., xlviii., 419.)

(Plate XLVI., fig. 13 ♀.)

This very handsome dark-coloured species was discovered by Mr. Philpott near Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are blackish-brown with coppery reflections; there is a broad irregular white streak along the dorsum and termen; several very obscure whitish marks on the costa and a round coppery-black mark at the apex. The hind-wings are greyish-black with very strong purple reflections.

The perfect insect appears in February, and is found in lowland forests.

Genus 7.—HECTACMA, Meyr.

Head rough. Basal joint of antennae elongate. Labial palpi moderately long, terminal joint enlarged with scales projecting at apex, longer than second. Maxillary palpi long, folded. Fore-wings with all veins present, 7 separate. Hind-wings ovate-lanceolate; 5 and 6 stalked, 6 to apex or costa (*chionodira*). (Plate K., figs. 7, 8, 9. Neuration and head of *Hectacma chasmatis*).

We have five species belonging to this interesting endemic genus. Three are restricted to the North Island; one to the Chatham Islands, and one occurs in both islands.

HECTACMA CHIONODIRA.

(Erechthias chionodira, Meyr., Proc. Linn. Soc. N.S.W., 1880, 268.)

(Plate XXXVI., fig. 28 ♀.)

This very interesting and distinctly-marked species is fairly common in the Wellington District, and has also occurred at Auckland and at Taranaki.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are snow-white with a very broad rich brown band along the dorsum and termen, being broadest on the termen where its inner edge is distinctly angulated; there is sometimes a minute brown discal dot above the middle. The hind-wings are white with the apical cilia tipped with brown.

This species varies considerably in size.

The perfect insect appears from November till February, and frequents forest. It is usually found resting on tree-trunks or fences where, notwithstanding its strongly-contrasted colouring, it is very inconspicuous. Whilst

thus engaged the wings are tightly closed; the antennae placed backwards along the top of the wings and the legs held close to the insect and almost entirely covered by the wings.

HECTACMA STILBELLA.

(Argyresthia stilbella, Dbl., Dieff. New Zeal., ii., 289; Walk., Cat. xxx. 849; *Erechthias stilbella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 265.)

(Plate XXXVI., fig. 18 ♀.)

This very clearly-marked species is common in the neighbourhood of Wellington and has also occurred at Auckland and Nelson.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are cream-coloured, faintly tinged with ochreous on the dorsum; there is a broad deep bronzy-black stripe from the base to the apex, running parallel with the dorsum; a very fine curved line from the costa at the base, joining the central stripe at about $\frac{1}{4}$; another very fine line from the costa at about $\frac{1}{4}$ almost reaching the central stripe; a fine line along the costal edge from $\frac{1}{4}$ to the apex and a black spot at the apex. The hind-wings are pale grey.

Although superficially similar to *Erechthias chasmatis* this species is quite distinct and its markings are very differently arranged.

The perfect insect appears from November till March, and frequents forest or scrub. It is usually taken resting on fences or tree-trunks and is often found in gardens.

HECTACMA CHASMATIAS.

(Erechthias chasmatis, Meyr., Proc. Linn. Soc. N.S.W., 1880, 264.)

(Plate XXXVI., fig. 17 ♂.)

This very neatly-marked species is fairly common in the neighbourhood of Wellington, and has also occurred at Whangarei, Auckland and Ohakune.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are rather elongate with the costa very strongly arched near the apex and the termen oblique; pale whitish-ochreous with dark brown markings; there is a longitudinal band on the dorsum from the base to about $\frac{1}{4}$, produced as a fine point into the disc; a very fine straight line extending from the costa at the base to the apex; a very fine apical streak and dot and an elongate tornal blotch. The hind-wings are white, very faintly tinged with greyish-ochreous.

The perfect insect appears from January till March, and frequents forest, where it may often be dislodged from the trunks of small trees by beating. Worn specimens are sometimes taken as late as the middle of April.

The appearance of this insect when at rest is very remarkable and achieves, in the most perfect manner, the effect of "reversal."

HECTACMA CRYPSIMIMA.

(Hectacma crypsimima, Meyr., Trans. N.Z. Inst., lii., 31.)

(Plate XLVII., fig. 11 ♂.)

This rather obscurely-marked little species has occurred at Days Bay, Wellington Harbour.

The expansion of the wings is barely $\frac{1}{2}$ inch. The fore-wings are elongate, narrow with the apex rounded and slightly produced; dull blackish-brown with black markings and numerous dull bronzy-brick-red scales in the disc, especially beyond the

middle; there is an obscure oblique black blotch on the costa at about $\frac{1}{2}$; a larger blotch near the middle and a narrow bar before the apex; several irregular markings on the dorsum and a rather conspicuous oblong black blotch in the disc beyond the middle; scattered whitish scales are present on the dorsal area and along the edges of the black markings; the cilia are blackish with two rows of black scales around the apex. The hind-wings are bronzy-black with numerous black scales; the cilia are black.

The perfect insect appears in February. It may be found resting on the black trunks of *Nothofagus fusca*, and has precisely similar habits to the somewhat larger *Archyala pentazyga*, and the very similar *Tinea fagicola*, the peculiar colouring of all three species, evidently having been acquired for protective purposes, in an identical environment.

HECTACMA DECORANDA.

(*Hectacma decoranda*, Meyr., Records of Canterbury Museum, N.Z., ii., 5, 274.)

(Plate LII., fig. 14 ♀.)

This very interesting little species was discovered by Mr. C. Lindsay at the Chatham Islands.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are clear pale yellow, duller and paler towards base; there is a rather narrow white border along the costa and a much broader white border along the termen; the other markings are black; a heavy longitudinal black bar on costa near base; two short oblique transverse lines on costa at $\frac{1}{2}$; five short slender oblique bars on costa near middle, and three similar bars before apex; two small black marks at apex, the outer most giving rise to a long tuft of black cilia; a minute black mark below apex, and a large black spot above tornus. The hind-wings and remaining cilia are pale grey.

The perfect insect appears in December. Mr. Meyrick remarks that "this very distinct species has no near relationship to the several known New Zealand species of the genus, but seems much closer to *spartinodes* from Assam; it would, however, be premature to assert that it may not itself be found in New Zealand."

Described and figured from a specimen kindly lent to me by Professor Speight, of the Canterbury Museum.

Genus 8.—TEPHROSARA, Meyr.

Head rough. Basal joint of antennae flattened, excavated beneath. Labial palpi moderately long, with rough projecting scales beneath throughout. Maxillary palpi long, folded. Fore-wings with all veins present, 7 and 8 stalked. Hind-wings ovate-lanceolate; 5 and 6 stalked, 6 to termen.

An endemic genus containing one species only.

TEPHROSARA CIMMERIA.

(*Erechthias cimmerica*, Meyr., Trans. N.Z. Inst., xli., 113.)

(Plate XXXVI., fig. 27 ♂.)

This is a rare and local species, apparently confined to the extreme north of New Zealand, the only specimens yet taken having been captured at Kaeo.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings have the costa strongly arched towards the apex, the apex itself very acute and the termen oblique; grey, becoming dark blackish-grey towards the apex; there are three longitudinal, very dark yellowish-brown stripes from the base converging near the middle of the wing and another finer stripe parallel

to the termen. The hind-wings are dark blackish-grey, darker towards the apex.

The perfect insect appears in January, and is found amongst Nikau Palms.

Genus 9.—PETASACTIS, Meyr.

Head rough. Basal joint of antennae flattened, excavated beneath. Labial palpi moderately long, second joint with projecting scales towards apex beneath. Maxillary palpi long, folded. Fore-wings with all veins present, 7 and 8 stalked. Hind-wings ovate-lanceolate; 5 and 6 stalked, 6 to costa.

Another endemic genus represented by one species.

PETASACTIS TECHNICA.

(*Ereunetis technica*, Meyr., Trans. N.Z. Inst., xx., 92.)

A single specimen of this species was taken by Mr. Meyrick at Whangarei in December.

The expansion of the wings of the female is about $\frac{1}{2}$ inch. Head white, crown ochreous-tinged. Palpi white, beneath with some black scales. Antennae white, with a black scale-streak at base. Thorax ochreous-white, with a lateral brownish-ochreous stripe. Abdomen grey. Anterior legs blackish; middle and posterior legs ochreous-white. Fore-wings elongate-lanceolate; greyish-ochreous, suffused with rather dark fuscous towards dorsum; markings white, faintly ochreous-tinged; a very fine longitudinal median line from base to $\frac{1}{2}$; seven wedge-shaped strigulae from costa, first two very oblique, reaching half across wing, first connected with base by a slender costal streak, five latter shorter and less oblique; a subtriangular spot on dorsum at $\frac{1}{2}$, and a sub-oval one at $\frac{3}{4}$; a small black apical spot: cilia light greyish-ochreous, with a blackish-grey median line on upper half, some white scales at base towards middle of termen, and two diverging blackish hooks at apex. Hind-wings and cilia light grey; costal cilia whitish.

Superficially this species has considerable resemblance with the Australian *Comodica tetracerella*, especially in the possession of the double apical hook in the cilia.

I am unacquainted with this insect. The above is taken from the original description.

Genus 10.—DRYADAULA, Meyr.

Head rough. Basal joint of antennae moderate. Labial palpi moderately long. Maxillary palpi long, folded. Fore-wings with all veins present, 7 and 8 stalked. Hind-wings ovate-lanceolate; 6 absent. (Plate K., figs. 25, 26, 27 neuration and head of *Dryadaula myrrhina*.)

Besides the three New Zealand species there are several Australian.

DRYADAULA MYRRHINA.

(*Dryadaula myrrhina*, Meyr., Trans. Ent. Soc. Lond., 1905, 243.)

(Plate XXXVII., fig. 19 ♀.)

This elegant and somewhat variable species has occurred in the North Island at Kaeo, north of Auckland, and at Kaitoke and Korokoro, near Wellington. In the South Island it has been found at Dunedin and Invercargill.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings, which have the apex rounded and the termen oblique, are very pale yellow, or whitish, becoming pale brown on the dorsum and towards the apex; there is a small oblique blackish mark on the costa at the base and a much larger mark near the middle; a series of small irregular black marks extends from a little before the apex to beyond the tornus. The hind-wings, which have the apex pointed, are pale ochreous-brown.

This species varies considerably in the ground colour, which is sometimes nearly white on both wings.

The perfect insect appears from October till January, and is found in forest.

DRYADAULA PACTOLIA.

(*Dryadaula pactolia*, Meyr., Trans. Ent. Soc. Lond., 1901, 577.)

(Plate LI., fig. 13 ♂.)

This species has occurred at Wellington, Nelson and Bealey River.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The head is clothed with long yellowish hairs. The antennae are dull yellowish, irregularly barred with black. The fore-wings are narrow-oblong; blackish-grey with pale yellowish-white markings; an irregular basal patch; a strongly-curved irregular band from costa at $\frac{1}{4}$ to beyond middle of dorsum; an elongate white spot in disc, considerably beyond the middle; several very small whitish marks on costa immediately before apex; the cilia are yellowish-white interspersed with grey. The hind-wings are pale grey with the cilia blackish.

The perfect insect appears from January till March, but is rarely met with.

DRYADAULA CASTANEA.

(*Dryadaula castanea*, Philp., Trans. N.Z. Inst., xlvii., 201.)

(Plate XXXVI., fig. 26 ♂.)

This very beautiful little species was discovered by Mr. Philpott at the Bluff. It has also occurred at Ohakune in the central district of the North Island, on Mount Egmont, at Wellington, and at Nelson.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are very deep golden-yellow somewhat darker on the costa; there is an obscure central white streak from the base to $\frac{1}{2}$; a fine, very wavy, transverse line at $\frac{1}{2}$; a stouter, outwards-curved, line at $\frac{3}{4}$ emitting two short streaks towards the termen; these two transverse lines are joined by a very wavy, faint streak near the dorsum; there is a series of white-edged black dots from a little before the apex along the termen. The hind-wings are grey.

The perfect insect appears from November till January, and frequents forest. It is evidently a rare species.

Genus 11.—ESCHATOTYP A, Meyr.

Head rough. Basal joint of antennae moderate, excavated beneath. Labial palpi moderately long, second joint with projecting scales towards apex beneath. Maxillary palpi long, folded. Fore-wings with all veins present, 7 separate. Hind-wings ovate-lanceolate; 5 and 6 stalked, 6 to termen. (Plate K., figs. 22, 23, 24 neurulation and head of *Eschatotypa derogatella*.)

An endemic genus containing two species.

ESCHATOTYP A DEROGATELLA.

(*Tinea ? derogatella*, Walk., Cat. xxviii., 485; Meyr., Trans.

N.Z. Inst., xli., 16.)

(Plate XXXVII., fig. 1 ♂.)

This species is common and generally distributed throughout the country.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings are very pale whitish-ochreous with numerous confused black-edged dull yellowish-brown markings; there is a basal patch; a curved band at $\frac{1}{2}$; a large, very irregular terminal patch, more or less clouded with blackish-brown with a white wedge-shaped mark above and below the apex; in addition to these markings numerous black and pale bluish-white scales are irregularly scattered over the disc, especially towards the ter-

men. The hind-wings are greyish-white, darker towards the termen.

Varies considerably in the depth of the colouring but the confused bluish-white and black discal speckling is always present.

The perfect insect appears from October till March, and frequents forest. It does not very readily take wing but runs with great rapidity seeking concealment in a crevice. When at rest the wings are closed over the back, forming a very steep roof; the anterior tarsi are placed forwards, curved and nearly touching; the tips of the intermediate and hind tarsi are just visible, and the antennae are placed backwards on each side of the wings.

ESCHATOTYP A MELICHRYS A.

(*Eschatotypa melichrysa*, Meyr., Trans. N.Z. Inst., xli., 16.)

(Plate XXXVII., fig. 2 ♀.)

This species, which is very closely allied to the preceding, is fairly common and generally distributed throughout the country.

The expansion of the wings is slightly under $\frac{3}{4}$ inch. It differs from *E. derogatella* in the following respects: The general colour is much brighter, the transverse bands being golden ochreous, broad, black-edged and very clearly defined; the numerous scattered bluish-white and black scales are completely absent and there is no black sub-basal line in the terminal cilia.

The perfect insect appears in December and January. In habits it resembles *E. derogatella* but, in the Wellington district, it is not quite so common as that species.

The black markings at the apex of the fore-wings, when closed, together with the tuft of cilia, unquestionably give the impression of an eye and a palpus, and would tend to distract an enemy's attention from the real head of the insect.

Sub-family 15.—TINEID ES.

Head usually rough; tongue usually absent. Labial palpi porrected or subascending, more or less obtuse. Maxillary palpi often long, folded. Fore-wings with vein 7 usually to costa, separate. Hind-wings elongate-ovate or lanceolate; 2-4 usually remote, parallel, 5 and 6 sometimes stalked, 7 separate. (Plate K., figs. 13-21, 28-36 and Plate A., figs. 4-6.)

A very large sub-family of universal distribution, but relatively most numerous in Africa. The larvae usually feed on dead wood, lichens, refuse, &c.*

Represented in New Zealand by the following twenty-three genera:

- | | |
|--------------------|-------------------|
| 1. ENDOPHTHORA. | 12. TINEA. |
| 2. CRYPTSITRICH A. | 13. ASTROGENES. |
| 3. HABROPHILA. | 14. PROTHINODES. |
| 4. BASCANTIS. | 15. PROTERODESMA. |
| 5. ARCHYALA. | 16. TRITHAMNORA. |
| 6. SAGEPHORA. | 17. LYSIPHRA GMA. |
| 7. THALLOSTOMA. | 18. LINDERA. |
| 8. TRICHO PHAGA. | 19. TITANOMIS. |
| 9. MONOPIS. | 20. TALEPORA. |
| 10. RHATHAMICTIS. | 21. MALLOBATHRA. |
| 11. TINEOLA. | 22. NARYCIA. |
| | 23. SCORIODYTA. |

*An account of the male Genitalia of the N.Z. members of this sub-family is given by Mr. Philpott in Trans. N.Z. Inst., lviii., 93.

Genus 1.—ENDOPHTHORA, Meyr.

Head rough. Maxillary palpi long, folded. Fore-wings with veins 2 and 3 connate from angle, 4 absent. Hind-wings lanceolate; cell open between 3 and 4, 5 and 6 stalked. (Plate K, figs. 13, 14, 15 neuration and head of *Endophthora omogramma*.)

An endemic genus, as now restricted, comprising three species.

ENDOPHTHORA OMOGRAMMA.

(*Endophthora omogramma*, Meyr., Trans. N.Z. Inst., xx., 94.)

(Plate XXXVI., fig. 23 ♂.)

This interesting little insect has occurred at Auckland, Wellington, Nelson and Lake Wakatipu, and although rather rare, appears to be generally distributed throughout the country.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are *creamy-white* faintly tinged with pinkish-brown; there is a narrow black line on the costal edge from the base to $\frac{1}{2}$; another shorter line at about $\frac{1}{3}$ and a third still shorter at $\frac{2}{3}$; the apical area is more or less speckled with reddish-brown scales and there are often small red blotches connected with the two outer costal marks. The hind-wings are pale grey.

The larva feeds amongst moss on tree-trunks, the pupa being enclosed in a cocoon amongst the moss.

The perfect insect appears from December till March, and frequents forest. It is generally found resting on tree trunks, and when thus occupied the wings are closed flat and parallel to each other; the antennae are placed backwards under the wings; the anterior tarsi are extended forwards, curved and almost touching, the tips of the intermediate tarsi being just visible. In this position the insect exactly resembles a minute flake of white bark.

ENDOPHTHORA PALLACOPIS.

(*Endophthora pallacopis*, Meyr., Trans. N.Z. Inst., I., 134.)

(Plate XL., fig. 1 ♂.)

This very beautiful little insect has occurred at Karori and Makara, near Wellington.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are elongate elliptical *very pale creamy-grey*, sometimes slightly tinged with pink, thinly sprinkled with pale olive-green scales and with several patches of pale olive-green; there is a cloudy pinkish shading on the costa at the base; three narrow black marks on the costa, the first near the base, the second near the middle and the third beyond the middle; each of these has a cloudy olive-green blotch below it and there are similar blotches near the termen and tornus and near the middle of the dorsum; there is a thin sprinkling of black scales along the dorsum and termen and the cilia are pinkish-grey mixed with black. The hind-wings and cilia are greyish-cream-colour, sometimes slightly tinged with pink. The head is white, the thorax pinkish-white and the abdomen greyish-cream colour.

The perfect insect appears in December, January and February, and may be looked for on tree trunks. It is a rare species.

ENDOPHTHORA TYLOGRAMMA.

(*Endophthora tylogramma*, Meyr., Trans. N.Z. Inst., IV., 206.)

(Plate L., fig. 15 ♂.)

This very dark-looking little species was discovered at Wilton's Bush, near Wellington.

The expansion of the wings is three-sixteenths of an inch. The fore-wings are lanceolate; *blackish-grey* mottled with black, the lighter portions tending to form transverse bands; the *dorsum* and *termen* are bordered with *whitish fawn-colour*, much broader near the base, where the pale colour projects into the darker colouring of the wing as two rounded bays, the edges of which are broadly margined with black; the middle of each "bay" contains several dark fawn-coloured scales. The hind-wings are pale grey. All the cilia are blackish-grey. The head is clothed with long pale fawn-coloured hair. The anterior portions of the thorax and posterior segments of the abdomen are blackish-grey, the posterior portion of the thorax and base of the abdomen being whitish-fawn colour.

The perfect insect appears in March and frequents forest.

Genus 2.—CRYSITRICHIA, Meyr.

Head rough. Basal joint of antennae rather dilated, with pecten. Labial palpi rather long, subascending, second joint with appressed scales, terminal joint shorter than second, slender. Maxillary palpi long, folded. Fore-wings with all veins present; on lower surface with fringe of short hairs on vein 1b in disc. Hind-wings lanceolate.

Six species occur in New Zealand belonging to this interesting genus and one species is found in Australia.

CRYSITRICHIA STEREOOTA.

(*Endophthora stereoota*, Meyr., Trans. N.Z. Inst., xlv., 114.)

(Plate XXXVII., fig. 7 ♀.)

This delicate little insect, which is the smallest of the genus, is fairly common in the neighbourhood of Auckland.

The expansion of the wings is about five-sixteenths of an inch. The fore-wings are elongate-elliptical with the apex rounded, *very pale greyish-white*; there are three conspicuous black marks on the costa inwardly shaded with golden-brown; several scattered black scales in the disc and at the apex and two faint oblique golden-brown marks on the fold each containing a few scattered black scales. The hind-wings and cilia are grey.

The perfect insect appears in January, and is found resting on tree trunks in light forest.

CRYSITRICHIA PHAROTOMA.

(*Endophthora pharotoma*, Meyr., Trans. N.Z. Inst., xx., 94.)

(Plate XL., fig. 15 ♀.)

This rather obscure species has occurred at Whangarei, Auckland, Palmerston North, Wellington and Christchurch.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch; of the female barely $\frac{1}{2}$ inch. The fore-wings are *narrow-elliptical*; *pale ochreous*; there is a *blackish-brown triangular patch* on the costa at the base and a *large rather irregular patch* beyond this; both are partially margined on their outer edges with black scales; a small, very narrow patch of dark brown is situated on the costa at $\frac{2}{3}$; the apical half of the wing is irregularly streaked with rows of orange-ochreous scales; there is a cluster of dark brown scales at the apex; the cilia are ochreous with a brown sub-apical patch. The hind-wings are pale greyish-ochreous, with pale ochreous cilia.

The perfect insect appears from December till March, and is generally found resting on tree trunks.

CRYSITRICHIA AGRIOPA.

(*Endophthora agriopa*, Meyr., Trans. N.Z. Inst., xx., 95.)

A single specimen of this species was captured by Mr. Meyrick at Wellington.

It is stated to be closely allied to *Crypsitricha pharotoma* and *mesotropa* but immediately separable by the dark grey hind-wings.

CRYPSITRICHIA MESOTYPA.

(*Endophthora mesotropa*, Meyr., Trans. N.Z. Inst., xx., 94.)

(Plate XXXVII., fig. 6 ♂.)

This very pretty little insect appears to be generally distributed from Auckland to Invercargill, but is nowhere abundant.

The expansion of the wings varies from $\frac{3}{4}$ to $\frac{5}{8}$ inch. The fore-wings are pale brownish-ochreous sometimes strongly tinged with green, especially in living specimens; the markings are rich blackish-brown; there are two small spots on the costa near the base; a curved stripe on the fold; a very conspicuous somewhat crescentic blotch on the costa before the middle, followed by a very pale patch; the posterior half of the costa is clouded with brown with a series of pale dots. The hind-wings, which have veins 5 and 6 separate, are pale greyish-ochreous. The legs are ochreous barred with black. The cilia are pale reddish-ochreous.

This species varies considerably in the extent and intensity of the dark markings. Some forms are strongly clouded with green and are extremely beautiful.

The perfect insect appears from December till March, and frequents forest. A very perfect instance of protection, through resemblance to moss, is exemplified in the colouring of this species. It always rests on moss-covered tree trunks with the wings closed, forming a steep roof; the large black costal patch completely breaks up the wing outline and, with the greenish-ochreous and paler markings, closely assimilates with the moss in general appearance. When disturbed the insect drops to the ground, running along and secreting itself in the nearest crevice. It very seldom attempts to fly.

CRYPSITRICHIA ROSEATA.

(*Endophthora roseata*, Meyr., Trans. N.Z. Inst., xlv., 28.)

(Plate XXXVII., fig. 22 ♂.)

This very beautiful little insect has occurred at Waimarino, Wellington and Invercargill, but appears to be extremely rare.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are very elongate with the apex acute; the whole of the basal third and the dorsal portion of the rest of the wing are pale rosy-brown, faintly tinged with purple; the remaining costal portion is warm rose colour; there are two minute black marks on the costa at the base; a broad oblique blackish-brown bar before the middle, not reaching the dorsum, and two or three minute marks beyond this; there is an indistinct series of brownish-black dots on the fold; the cilia are bright orange brown, with two broad black bars towards the apex. The hind-wings are very pale greyish-ochreous, with the cilia golden-ochreous.

The perfect insect appears from November till March, and is found in dense forest ravines. It rests with the wings closely appressed to the body, forming a steep roof; the antennae are placed backwards underneath the wings; the tarsi of the fore-legs are placed forwards with their tips convergent; only the tips of some of the other tarsi are exposed. In this position the insect resembles a minute stick.

CRYPSITRICHIA GENEROSA.

(*Crypsitricha generosa*, Philp., Trans. N.Z. Inst., lvi., 398.)

(Plate LII., fig. 16 ♂.)

This very distinct species was discovered by Mr. S. Lindsay, at Lake Manapouri.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are lanceolate, very pale brownish-ochreous; there is a very broad almost black costal band from the base to beyond $\frac{1}{2}$ where it terminates in a very acute curved point; on its dorsal edge, some distance before its termination, there is a conspicuous rectangular indentation; a warm ochreous-brown patch at the apex and many patches of similarly coloured scales along the lower edge of the costal band and on termen and dorsum; the cilia are very pale brownish-ochreous, mixed with warm ochreous-brown. The hind-wings are lanceolate, grey-white with whitish cilia. The head is whitish-ochreous; the antennae blackish. The hind tibiae are clothed with very long whitish-ochreous hairs.

The perfect insect appears in December.

Genus 3.—HABROPHILA, Meyr.

Head shortly rough-haired. Basal joint of antennae with pecten. Labial palpi with second joint shortly tufted beneath. Maxillary palpi long, folded. Fore-wings with discal tuft; all veins present. Hind-wings lanceolate, veins 5 and 6 stalked.

An endemic genus containing one species

HABROPHILA COMPSEUTA.

(*Habrophila compseuta*, Meyr., Trans. N.Z. Inst., xxi., 161.)

(Plate XL., fig. 19 ♂.)

This very beautiful little insect has occurred at Auckland, Karori and Gollan's Valley near Wellington, on D'Urville Island and on Mount Arthur near Nelson, at an altitude of 4,000 feet.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are brownish-grey with bright cobalt blue, blackish and white markings; there are several irregular patches of rather dull blue near the base; a large irregular trapezoidal white patch on the costa near the middle and a small obscure white mark in the disc beyond this; the apical area is bright cobalt blue; there is a blackish triangular spot on the termen near the apex; a narrow black costal border before the apex and several glistening whitish dots; all the white markings on the fore-wings are edged with blackish. The hind-wings are grey, slightly tinged with blue. The body is ochreous-brown, strewn with numerous blue scales. The cilia of all the wings are blackish-grey, but there is a tuft of golden-brown cilia on the costa before the apex.

The perfect insect appears from January till March, and may be obtained by sweeping ferns and undergrowth, in open forest. It is apparently rather a rare species. When resting the wings are held almost flat, widely divergent at the tips; the antennae are placed backwards under the wings, and the palpi extended forwards converging.

Genus 4.—BASCANTIS, Meyr.

Head shortly rough-haired. Basal joint of antennae without pecten. Labial palpi with second joint tufted beneath. Maxillary palpi long, folded. Fore-wings with all veins present. Hind-wings trapezoidal-ovate, veins 2-7 separate.

Another endemic genus represented by one species only.

BASCANTIS SIRENICA.

(Bascantis sirenica, Meyr., Trans. N.Z. Inst., xlvii., 115.)

(Plate XXXVII., fig. 23 ♂.)

This remarkable-looking species was discovered at Kaco, north of Auckland. It has also occurred on the Waitakere Ranges and at Day's Bay, Wellington Harbour.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings, which have the apex very much rounded, are dull greyish-black with strong blue reflections; there is a large semi-circular pale ochreous patch on the costa near the middle and two conspicuous curved pale blue markings on the apical area. The hind-wings, which have the termen unusually straight, are grey with very strong golden-bronzy reflections.

The perfect insect appears in January, and is found in forest. It is best obtained by sweeping. There is a strong resemblance in wing-markings between this species and *Acrocercops zorionella* and it seems possible that both these insects mimic, in their general appearance, the common and conspicuous little longicorn beetle *Zorion guttigerum*.

Genus 5.—ARCHYALA, Meyr.

Head loosely-haired. Basal joint of antennae with pecten. Labial palpi with second joint rough-scaled towards apex beneath, with some apical bristles, terminal joint flatly compressed. Maxillary palpi long, folded. Fore-wings with all veins present. Hind-wings elongate-ovate; 5 and 6 stalked. (Plate K., figs. 19, 20, 21, neuration of *Archyala terranea*.)

An endemic genus of which four species are known and others probably remain to be discovered.

ARCHYALA PARAGLYPTA.

(Archyala paraglypta, Meyr., Trans. N.Z. Inst., xxi., 159.)

(Plate XXXVII., fig. 3 ♂.)

This very rare insect has occurred at Wellington, Wai-nuiomata, Christchurch and Invercargill.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are elongate with the costa almost straight and the apex and tornus rounded; whitish-grey, very finely speckled with darker; there are five rather broad, oblique, pale bronzy-brown transverse bands, clearly defined on the costa, often interrupted in the disc, and very irregular on the dorsum; all these bands are speckled and margined with dark brown. The hind-wings are greyish-ochreous, with strong golden-bronzy reflections.

The transverse bands vary in distinctness and in some specimens are very confused.

The perfect insect appears in January and February, and frequents forest.

ARCHYALA HALOSPARTA.

(Archyala halosparta, Meyr., Trans. N.Z. Inst., li., 354.)

(Plate XLVII., fig. 9 ♂.)

This obscurely-marked species has occurred at Wai-nuiomata and Gollan's Valley, near Wellington.

The fore-wings are elliptical with the costa rather strongly arched and a distinct apical lobe; dull greyish-ochreous sprinkled with blackish and with strong purple reflections; there is a series of obscure dark-edged whitish bars on the costa; a blackish apical spot; a distinct white mark near the tornus and numerous confused ochreous and blackish streaks in the disc. The hind-wings are grey, with strong bronzy iridescent reflections.

The perfect insect appears in December and January, frequenting forest. The markings in this species are suggestive of *Glyphipteryx*.

ARCHYALA PENTAZYGA.

(Archyala pentazyga, Meyr., Trans. N.Z. Inst., xlvii., 204.)

(Plate XXXVII., fig. 4 ♂.)

This very dark-looking little insect has occurred at Day's Bay, Wellington Harbour, Gollan's Valley, and Kinloch, Lake Wakatipu.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elongate-oblong with the costa strongly arched and the apex receding; grey with numerous rich brownish-black markings; there is a broad irregular wavy transverse bar near the base hardly reaching the dorsum; another band before the middle emitting a large projection into the disc; beyond this there are three heavy oblique bars on the costa with finer bars between them; there are several small irregular blackish marks on the termen and dorsum and the whole wing is more or less sprinkled with blackish-brown and bronzy dots. The hind-wings are grey, darker towards the apex, with coppery reflections.

The perfect insect appears in December and January, and frequents beech forests, resting on the black tree-trunks, where it is very inconspicuous. It flies freely in the hot afternoon sunshine.

ARCHYALA TERRANEA.

(Scardia terranea, Butl., Cist. Ent. ii., 510; Meyr., Trans. N.Z. Inst., xx., 100; Archyala opulenta, Philp., ib., lvi., 398.)

(Plate XXXVII., fig. 5 ♀.)

This rather conspicuous species has occurred fairly commonly at Wellington, Nelson, Christchurch, Castle Hill, Dunedin, Lake Wakatipu, Invercargill and the Chatham Islands.

The expansion of the wings is about 1 inch. The head is densely clothed with long reddish-ochreous hairs. The fore-wings are elongate-elliptical with the apex rather blunt and the termen very obliquely rounded; golden ochreous, thickly dotted with blackish-brown spots; there is a series of larger spots along the costa and termen; two large spots placed obliquely in the disc at about $\frac{1}{2}$ and two irregular spots beyond these. The hind-wings are brownish-grey, strewn with golden scales, and with strong purple reflections.

This species varies a little in the general intensity of the colouring and in the extent and depth of the blackish spots, the males being usually darker and somewhat smaller than the females.

According to Mr. Meyrick the larva feeds in moss on rocks and the pupa is enclosed in a very dense rough cocoon amongst the moss.

The perfect insect appears from November till March, and is usually observed resting on palings and on the walls of outbuildings. It thus seems to be acquiring semi-domestic habits.

Genus 6.—SAGEPHORA, Meyr.

Head shortly rough-haired. Basal joint of antennae without pecten. Labial palpi with second joint rough-scaled beneath, with some long bristles. Maxillary palpi long, folded. Fore-wings with all veins present. Hind-wings elongate-ovate; vein 4 absent. (Plate K., figs. 16, 17, 18 neuration and head of *Sagephora phortegella*.)

Another endemic genus containing five species.

SAGEPHORA EXSANGUIS.

(*Sagephora exsanguis*, Philp., Trans. N.Z. Inst., 1, 131.)

(Plate XL, fig. 18 ♂.)

This rather obscurely-marked species was discovered by Mr. Philpott near the Bluff. It has also occurred at Auckland, Wellington and Dunedin.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are creamy-white with a broad longitudinal costal band sprinkled with pale brown scales; there is a broken bright ochreous-yellow band from the base to the termen below the apex and a very broken irregular dark brown marking from about the middle of the dorsum to the tornus more or less clouded with ochreous-yellow. The hind-wings and cilia are creamy-white.

The perfect insect appears from October till December, and frequents forest.

Described and figured from a specimen in Mr. Philpott's collection.

SAGEPHORA FELIX.

(*Sagephora felix*, Meyr., Trans. N.Z. Inst., xlv., 114.)

(Plate XXXVII, fig. 14 ♀.)

This very distinctly-marked little insect has occurred at Kaeo north of Auckland, at Auckland, and at Wellington. It is apparently a rare species, but in the field might easily be mistaken for the common *Sagephora phortegella*.

The expansion of the wings is under $\frac{1}{2}$ inch. The fore-wings are shining snow-white; there is a deep bronzy brown stripe along the edge of the costa from the base to about $\frac{1}{2}$; a very large round dark brown spot in the disc touching the extremity of the costal stripe; several irregular scattered dark brown marks on the dorsal and apical areas, those nearest the costa being the largest. The hind-wings are white very faintly tinged with grey. The antennae are white with blackish bars at $\frac{1}{2}$ and at the tip.

The perfect insect appears from January till March, and frequents forest.

SAGEPHORA PHORTEGELLA.

(*Sagephora phortegella*, Meyr., Trans. N.Z. Inst., xx., 96.)

(Plate XXXVII, fig. 20, 21 varieties.)

This rather variable species is common and generally distributed throughout the country.

The expansion of the wings varies from five-sixteenths of an inch to $\frac{1}{2}$ inch. The antennae are white with the terminal third black except two white rings at the apex. The fore-wings are creamy-white with a broad wavy blackish-brown band on the costa from the base to about $\frac{1}{2}$ and a series of black terminal dots; in some specimens the costal band is wider and there are one or two curved, wavy, brown streaks from the base to the termen; the terminal area is also frequently more or less clouded with pale grey. The hind-wings are pale grey.

The perfect insect appears from October till March, and frequents forest. When at rest the wings are closed vertically, forming a steep roof; the insect stands on its fore- and intermediate tarsi; the hind-legs being held close to the body and hidden by the wings, the antennae are extended straight in front of the insect, parallel, and generally almost in contact. When in this position the general appearance is that of a rather long slender insect, the real head being of course actually situated somewhat beyond its middle.

SAGEPHORA JOCULARIS.

(*Sagephora jocularis*, Philp., Trans. N.Z. Inst., lvi., 398.)

(Plate LII, fig. 33 ♀.)

This species was discovered by Mr. Philpott at Tisbury, near Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings have a broad deep chocolate-brown patch on the costa, extending from the base to $\frac{1}{2}$, and reaching half-way across the wing in the disc; the discal and plical areas are clear pale ochreous, the apical terminal and dorsal areas being irregularly clouded and speckled with chocolate-brown; there is a marginal series of black bars, with white interspaces, from just before apex to tornus. The hind-wings are pale greyish-brown speckled with darker.

Apparently somewhat intermediate between *S. phortegella* and *S. steropastis*.

The perfect insect appears in January.

Described and figured from a specimen in poor condition, submitted by Mr. Philpott.

SAGEPHORA STEROPASTIS.

(*Sagephora steropastis*, Meyr., Trans. N.Z. Inst., xxiii., 100.)

(Plate XXXVII, fig. 15 ♀.)

This is a much more richly-coloured insect than *S. phortegella* to which, however, it is evidently very closely allied, although apparently quite a distinct species. At present it has only been recorded from Wellington.

The expansion of the wings is $\frac{1}{2}$ inch. The antennae are yellowish-brown broadly barred with black near the apex. The fore-wings are very deep brownish-black with a very strongly-curved wavy cream-coloured streak from the costa near the apex to the base; this streak, which runs near the edge of the wing, is much wider and more diffused on the dorsum, especially towards the base; it is also more or less bordered with yellowish-brown. The hind-wings are pale greyish-brown.

The perfect insect appears in October and November, and frequents dense forests. It is rather a rare species.

Genus 7.—THALLOSTOMA, Meyr.

Head rough. Basal joint of antennae with pecten. Labial palpi with second joint slightly rough-scaled beneath. Maxillary palpi moderate, curved, ascending. Fore-wings with cell very long; all veins present. Hind-wings elongate-ovate; veins 5 and 6 short-stalked.

An endemic genus represented by one species only.

THALLOSTOMA EURYGRAPHA.

(*Thallostoma eurygrapha*, Meyr., Trans. N.Z. Inst., xlv., 29.)

(Plate XXXIX, fig. 3 ♀.)

This very boldly-marked insect has occurred at Rau-rimu, Ohakune, and at Wilton's Bush and Wainuiomata near Wellington, but is very rare.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rather elongate with the termen very oblique; pale whitish-ochreous; there is a very large, broad, irregular, black costal marking from the base almost to the apex; a semi-circular patch of the pale ground colour on the costa near the middle; below this the black marking almost reaches the dorsum; there are several minute black terminal dots. The hind-wings are grey.

The perfect insect appears from November till January, and frequents dense forests.

Genus 8.—TRICHOPHAGA, Rag.

Head rough. Labial palpi moderate, porrected. Maxillary palpi long, folded. Fore-wings with veins 10-12 successively running each into vein following it, not reaching costa. Hind-wings elongate-ovate; 2-7 separate.

A genus of one African species and two others now widely distributed by artificial introduction, but probably originating round the Mediterranean.

One species occurs in New Zealand.

TRICHOPHAGA TAPETIELLA.

(*Tinea tapczella*, Linn. Syst. Nat., 536; *Tinea tapctictella*, Meyr., Trans. N.Z. Inst. xx., 98; *T. palaestrica*, Butl., Proc. Zool. Soc. Lond. 1877, 404.)

(Plate XXXIX., fig. 2 ♀.)

Single specimens of this well-known domestic insect have been met with at Wellington, Nelson, Invercargill, and on the Chatham Islands, but at present it must be regarded as a rare species in New Zealand.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are blackish-brown from the base to about $\frac{2}{3}$, the dark portion extending a little further on the costa than on the dorsum; the rest of the wing is cream-coloured faintly mottled with grey; there is a brown spot containing two white dots at the apex and two or three blackish specks at the tornus. The hind-wings are brownish-grey.

The larva feeds on cloth, constructing a gallery of pieces of gnawed cloth and its own silk, it is partial to situations much exposed to the air, and is particularly fond of the linings of carriages and green-baize doors; it feeds during the autumn and winter.*

The perfect insect appears from October till March, and is always met with in close proximity to dwellings. It has unquestionably been introduced from Europe by civilization and occurs also in Australia and North America. When resting on walls or fences it is rather conspicuous, owing to its contrasted colours, which nevertheless are protective from their resemblance to bird droppings.

Genus 9.—MONOPIS, Hübn.

Head rough. Labial palpi moderate, porrected. Maxillary palpi long, folded. Fore-wings with more or less developed subhyaline spot in cell; 3 and 4 stalked. Hind-wings elongate-ovate. (Plate A., figs. 4, 5, 6 neurulation and head of *Monopis ethelella*.)

Not very numerous, but of general distribution. The larvae feed on refuse.

There are four species in New Zealand.

MONOPIS ORNITHIAS.

(*Blabophanes ornithias*, Meyr., Trans. N.Z. Inst., xx., 97.)

(Plate XXXVII., fig. 25 ♀.)

This very dull-coloured, inconspicuous species has occurred at Christchurch, Dunedin and West Plains, near Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate with the apex rounded and the termen oblique; veins 6 and 7 stalked; dull brown, irregularly streaked with dull black; there is often a paler discal spot near the middle and

an obscure paler streak along the dorsum. The hind-wings are dull brown.

The larva lives in old birds' nests, feeding on the decayed feathers and other refuse.

The perfect insect appears from October till February, and sometimes enters houses. It is, however, best obtained by rearing specimens from the larva.

Described and figured from a specimen in Mr. Philpott's collection.

MONOPIS ETHELELLA.

(*Tinea ethelella*, Newm., Trans. Ent. Soc. Lond., iii. (n.s.), 288; *T. rectella*, Walk., Cat. xxviii., 482; *Blabophanes namuella*, Feld., Reis. Nov., pl. cxi., 44; *B. ethelella*, Meyr., Trans. N.Z. Inst., xx., 97.)

(Plate XXXIX., fig. 1 ♀.)

This species appears to be common and generally distributed throughout the country and is found on the Chatham Islands.

The expansion of the wings varies from $\frac{1}{2}$ to $\frac{3}{4}$ inch. The fore-wings, which have veins 6 and 7 stalked, are dark brownish-black with a broad ochreous streak along the dorsum, a transparent ochreous discal spot, and some obscure whitish-ochreous dots. The hind-wings are greyish-ochreous.

The larva feeds on soiled wool, and is often found amongst the wool adhering to the bones of dead sheep, in the last stages of decomposition*.

The perfect insect appears from October till May, frequenting the vicinity of cultivation. It is often attracted by light. It also occurs commonly in Australia and Tasmania.

MONOPIS CROCICAPITELLA.

(*Monopis crocicapitella*, Clem., Proc., Acad. Nat. Sci. Phila., 1859, 257; *Blabophanes ferruginella*, Meyr., Trans. N.Z. Inst., xx., 97 [nec Hübn.].)

(Plate XXXIX., fig. 22 ♂.)

This well-known domestic insect is common and generally distributed throughout the country.

It is much smaller than *M. ethelella*, the expansion of the wings being about $\frac{1}{2}$ inch. The head and dorsal streak are reddish-ochreous, the rest of the fore-wings being slightly purplish-tinged. The hind-wings are pale greyish-ochreous. In other respects it is very similar to *M. ethelella*.

The perfect insect, which frequents cultivated localities, is found almost all the year round. It has been introduced from Europe by civilization, and now occurs in North America, Africa and Australia. The true *M. ferruginella* is much more restricted in its range.

MONOPIS TYPHLOPA.

(*Monopis typhlopa*, Meyr., Records of Canterbury Museum, ii., 5, 274.)

This very interesting species was discovered by Mr. C. Lindsay, at Mangere, Chatham Islands.

The expansion of the wings is about $\frac{1}{2}$ inch. "Head whitish-ochreous. Palpi dark fuscous, apex whitish-ochreous. Thorax whitish-ochreous, patagia dark purplish-fuscous. Fore-wings with apex obtuse-pointed termen very obliquely rounded; 2 and 3 out

*Stainton: British Butterflies and Moths, 265.

*J. G. Myers, N.Z. Journal of Science and Technology, v., 208 (1922).

of 4, 6 to costa, 7 and 8 stalked, 9 closely approximated, 10 nearly from angle, 11 from $\frac{3}{4}$; dark purplish fuscous; a rather irregular-edged whitish-ochreous dorsal streak from base to tornus; discal impression hardly marked, not hyaline; costa obscurely freckled whitish-ochreous on posterior half; cilia dark fuscous, base obscurely freckled whitish-ochreous, on tornus whitish-ochreous. Hind-wings pale grey, with whitish-ochreous reflection; cilia ochreous-whitish." (Meyrick).

Regarding this insect Mr. Meyrick adds, that "although at first sight similar to *M. ethelcella*, it is really a very distinct species, by the absence of the hyaline impression (almost always well-marked in the genus), and the quite different neurulation (which in this genus tends to be more or less peculiar in nearly every species). *Monopis* is a cosmopolitan genus; the members of it are usually semi-domesticated or parasitic on human settlements, and their specific development can hardly antedate these, but may be considered a sort of index to them; I think it is quite likely that *M. typhlopa* may be strictly confined to the Chatham Islands, in which case it affords important evidence of the early visitors who introduced it."

Genus 10.—RHATHAMICTIS, Meyr.

Head loosely rough-haired; ocelli posterior; tongue absent. Antennae $\frac{1}{2}$, in male moderately ciliated, basal joint short, with slight pecten. Labial palpi moderate, porrected, second joint rough-scaled beneath, terminal joint short, loosely scaled, obtuse. Maxillary palpi short, slender, 3-jointed, folded laterally. Posterior tibiae rough-scaled above. Fore-wings vein 2 from five-sixths, 3 from angle, 7 to termen, 8-10 approximated, 11 from before middle. Hind-wings 1, elongate-ovate, cilia $\frac{3}{4}$; 2-7 tolerably parallel.

An interesting form, probably aculeate and allied to *Lampromia*.

Represented by a single species discovered quite recently.

RHATHAMICTIS PERSPERSA.

(*Rhathamictis perspersa*, Meyr., Trans. N.Z. Inst., lv., 662.)

(Plate XL, fig. 16 ♂.)

This species has occurred in Wilton's Bush near Wellington.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are oblong with the apex and tornus much rounded, dark brownish-black with dull ochreous-white markings; there is a series of small ochreous-white spots along costa and a few spots irregularly dispersed on the terminal, subterminal and dorsal areas. The hind-wings are dark grey with purple reflections. All the cilia are blackish-brown interspersed with a few ochreous-white scales.

The perfect insect appears in March and is found in forest.

Genus 11.—TINEOLA, Herr.-Schäff.

Head rough. Labial palpi moderate, porrected. Maxillary palpi short, simple, porrected. Fore-wings with all veins present. Hind-wings elongate-ovate.

Principally developed in Africa. The single New Zealand species has been artificially introduced.

TINEOLA BISELLIELLA.

(*Tinea bisellielia*, Hüb., Ess. Ent. iii., 13; *Tincola bisellielia*, Meyr., Trans. N.Z. Inst., xx., 101.)

(Plate XLVI, fig. 9 ♂.)

This destructive household pest has occurred at Wellington, Christchurch and Lake Wakatipu. It is probably generally distributed in many houses throughout New Zealand.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are glossy pale ochreous with no markings. The hind-wings are whitish with pale ochreous cilia.

The whitish larva feeds in the lining of chairs and sofas, and will also bore holes through any clothing, which may be folded up and put away in places where the insect has established itself. When a colony of these larvae has once effected a settlement they go on breeding, year after year, in the interior of the chair, sofa, or mattress, till after the lapse of a few years the contents may be entirely destroyed, without our attention having been called to the mischief; they are also very destructive to carpets. This larva does not construct a portable case but forms silken galleries in the substance on which it is feeding.*

The perfect insect may be found in houses and out-houses throughout the year, but is commonest during the summer months. It has been widely spread over the world by civilization.

Genus 12.—TINEA, Linn.

Head rough. Labial palpi moderate, porrected. Maxillary palpi long, folded. Fore-wings with all veins present. Hind-wings elongate-ovate.

A large and cosmopolitan genus, of which we have fourteen species in New Zealand; four confined to the North Island; four to the South Island, and six common to both islands.

TINEA MARGARITIS.

(*Tinea margaritis*, Meyr., Trans. N.Z. Inst., xli., 116.)

(Plate XXXVII, fig. 26 ♀.)

This very interesting little insect, which appears to be a mimic of *Glyphipteryx leptosema*, has occurred at Wellington and at Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are elongate with the apex rounded and the termen oblique; black with strong bronzy and purplish reflections; there are six rather slender cream-coloured bars on the costa, the two nearest the apex being broader and crescentic; a large cream-coloured patch is situated on the dorsum near the middle and a smaller patch before the tornus; there are also several minute spots near the base and in the disc. Two conspicuous tufts of cream-coloured scales in the cilia below the apex give that portion of the wing the same general appearance as in *Glyph. leptosema* though the real outline is altogether different. The hind-wings are greyish-ochreous.

There appears to be slight variation in size. In specimens which have been long on the wing the ground colour of the fore-wings fades into a pale purplish-grey.

*Stanton: British Butterflies and Moths, 266.

The perfect insect appears in December and January, and is found in dense forest ravines, where it is very difficult to see in the uncertain light. Its resemblance to *Glyphipteryx leptosema* is so close that an instance of protective mimicry is suggested.

TINEA FAGICOLA.

(*Tinea fagicola*, Meyr., Trans. N.Z. Inst., liii, 336.)

(Plate XLVII, fig. 15 ♂.)

This little species is fairly common in the beech forests on the eastern side of Wellington Harbour.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. Closely allied to *T. margaritis*, from which it differs in the extremely mottled character of the ground colour and markings; the absence of the large triangular white patch near the middle of the dorsum; the relatively shorter and stouter palpi and the antennae which in *T. margaritis* are relatively longer with closer and much more numerous joints (nearly 50), whilst in *T. fagicola* they do not much exceed 30 and are more distinct.

The perfect insect appears from December till February, and flies actively in hot sunshine. It rests on the blackened trunks of *Nothofagus fusca*, in which situation it is extremely hard to see. The resemblance to *Glyphipteryx* is not so close in this species as it is in *T. margaritis*.

TINEA SPHENOCOSMA.

(*Tinea sphenocosma*, Meyr., Trans. N.Z. Inst., li, 353.)

(Plate XXXVII, fig. 24 ♀.)

A few specimens of this very interesting species have occurred in the neighbourhood of Wellington.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are deep brownish-black, with purplish and bronzy reflections, closely strewn with irregular whitish dots or small spots except towards costa; there are eleven slightly oblique transverse or wedge-shaped white spots from costa, the first five extended as streaks nearly half across wing, fifth enlarged into spot at extremity; the cilia are brown with two darker shades; a direct projecting dark brown bar at apex margined on both sides by triangular white spaces. The hind-wings are purplish-brown, the cilia brown.

The perfect insect appears from December till March. It occurs amongst scrubby forest, and further specimens will most likely be obtained by careful sweeping. The resemblance of the markings of this insect to those present in certain species of *Glyphipteryx* is most remarkable, and is strongly suggestive of mimicry.

TINEA ACCUSATRIX.

(*Tinea accusatrix*, Meyr., Trans. N.Z. Inst., xlviii, 419.)

(Plate XLVII, fig. 2 ♂.)

This very distinctly-marked little species has occurred at Kaitoke and on the eastern side of Wellington Harbour.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are elongate with the costa rather strongly arched before apex; creamy-white, with bronzy-grey markings, more or less strongly outlined in blackish; two large curved wedge-shaped marks on basal half of costa; two very fine longitudinal streaks in disc below these; two smaller wedge-shaped marks followed by three crescentic bars on outer half of costa; a conspicuous black spot at apex; a small mark on dorsum at base; a very elongate curved mark near middle of dorsum; several indistinct marks on termen connected with the costal bars;

the costal cilia are cream-coloured with the darker bars continued thereon; a long dark tuft at apex; basal half of terminal cilia bronzy, apical half creamy-white tipped with black. Hind-wings and cilia very pale grey.

The perfect insect appears from the middle of October until December. It frequents beech forests, resting on the blackened trunks, where it closely resembles a minute fragment of dried grass. It is very wary and flies with considerable rapidity. The resemblance of the wing markings and cilia to those of certain species of *Glyphipteryx* is unmistakable.

TINEA ASTRAEA.

(*Tinea astraea*, Meyr., Trans. N.Z. Inst., xliii, 68.)

(Plate XXXVII, fig. 13 ♂.)

This rare and interesting species was discovered by Mr. Philpott at Otatara, near Invercargill.

The expansion of the wings is barely five-sixteenths of an inch. The fore-wings are pale grey with blackish-grey markings; there are several indistinct patches of dark scales on the basal third; two broad but rather faint costal bars in the middle and at $\frac{1}{2}$, reaching more than half-way across the wing; the apical and terminal areas are wholly blackish-grey; there are three or four distinct, curved, pale whitish-crescentic marks on the costa near the apex and the terminal cilia are arranged in three distinct series, thus giving the insect a strong superficial resemblance to a *Glyphipteryx*. The hind-wings are grey with purplish reflections.

The perfect insect appears in December, and frequents forest. The resemblance to *Glyphipteryx* is here very pronounced and requires explanation.

Described and figured from rather poor specimens in Mr. Philpott's collection.

TINEA CYMODOCE.

(*Tinea cymodoce*, Meyr., Trans. N.Z. Inst., lv, 206.)

(Plate XLVII, fig. 13 ♂.)

This species has occurred in the North Island at Whakapapa on the lower slopes of Mount Ruapehu, at an altitude of about 4,000 feet, and at Makara near Wellington. In the South Island it has been found on Mount Arthur (3,600 feet), and at Opoho near Dunedin.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are elliptical, bronzy black in male with strong golden-ochreous reflections and fine white markings; there are three double lines on costa, at about $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$, reaching half-way across the wing, and four single short bars beyond this; on the dorsum there is an irregular white blotch at about $\frac{1}{2}$; four rather indistinct lines between this and apex; the lines on termen are connected with several of the costal lines by obscure steely-blue patches; there is a very distinct jet black spot at the apex, and the termen and apical portion of the costa are bordered with jet black scales, broken by the ends of the white lines; the cilia are blackish mixed with bronze. The hind-wings are pale grey, strewn with blackish scales, with purplish reflections. In the female the general ground colour is very much paler, inclining to whitish-ochreous in the disc, the bronzy-black colouring being confined to the interspaces between the transverse lines on costa and dorsum.

The perfect insect appears in November, December and January. This species has a deceptive resemblance to certain species of *Glyphipteryx*.

TINEA AETHEREA.

(*Tinea aetherea*, Clarke, Trans. N.Z. Inst., lvi., 421.)

(Plate LII, fig. 13 ♂.)

This very interesting species was discovered by Mr. C. E. Clarke at Arthur's Pass.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The forewings are elongate-elliptical, with the termen very obliquely rounded; *pale greyish-white with blackish markings*; a narrow margin on costa at base; an anvil-shaped mark on dorsum near base; a series of small irregular marks along fold; a curved, rapidly tapering bar on costa at $\frac{1}{4}$, and a similar, but larger marking, at about $\frac{3}{8}$; four black costal bars with white interspaces beyond this; a circular black apical patch, followed by two minute white marks on termen; *a fine black marginal line thence to tornus*; a small tornal blotch; on apical third the ground colour of the wing has strong golden-brown reflections, and there are a few very dull purplish-blue scales scattered over the basal area; the cilia are grey with white bars opposite the white markings on the outer third of wing. The hind-wings are ochreous-grey with very faint purplish reflections; the cilia are grey. The head is whitish; the thorax grey; the abdomen blackish-grey with paler anal tuft.

This species seems closely allied to *Tinea astraca* and *T. cymodoce*, but quite distinct from either. It belongs to that remarkable section of the genus which have the markings imitative of a typical *Glyphipteryx*.

The perfect insect appears in January.

Described and figured from a slightly damaged specimen kindly submitted by Mr. Chas. E. Clarke.

TINEA ARGODELTA.

(*Tinea argodelta*, Meyr., Trans. N.Z. Inst., xlvii., 204.)

(Plate XXXVII, fig. 9.)

This very distinctly-marked little insect was discovered by Mr. Philpott at Invercargill. A single specimen has also occurred at Wellington.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The forewings are rather broad with the apex rounded and the termen oblique; *dull purplish tinged with dull red in the disc and thickly speckled with black*; there is a large semi-circular white spot on the dorsum near the middle; three rather large white dots at the tornus and several smaller dots at the apex; there are three series of fine white lines on the costa, the first at the base, the second near the middle and the third beyond the middle; all the white markings are more or less distinctly bordered with black. The hind-wings are deep brownish-purple.

The perfect insect appears from December till February. It is a very rare species.

Described and figured from a specimen in Mr. Philpott's collection.

TINEA DICHARACTA.

(*Tinea dicharacta*, Meyr., Proc. Linn. Soc. N.S.W., 1892, 536;

Trans. N.Z. Inst., xliii., 78.)

(Plate XXXVII, fig. 8 ♀.)

Three specimens of this extremely rare little species have been taken at Wellington and others at Dunedin.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The head is *bright ochreous*, the thorax and abdomen being dark purplish-brown. The forewings are *purplish-brown* with four irregular, broken purplish-black transverse bands, clearest on the costa and dorsum; *there is a cloudy whitish patch on the dorsum and numerous irregular pale dots, especially near the edges of the transverse bands*. The hind-wings are purplish-grey.

The perfect insect appears in November and December. It seems to frequent houses and may possibly be semi-domestic in its habits. The original description was taken from a unique specimen captured by Mr. Meyrick at Sydney. Mr. Charles E. Clarke has met with it resting on the bark of manuka trees.

TINEA FUSCIPUNCTELLA.

(*Tinea fuscipunctella*, Haw., Lep. Brit. 562; Meyr., Trans.

N.Z. Inst., xx., 100.)

(Plate XL, fig. 4 ♂.)

This well-known domestic insect is common and generally distributed throughout the country.

The expansion of the wings is about $\frac{1}{2}$ inch. The forewings are rather narrow with the apex round and the termen extremely oblique; *pale ochreous with dusky-brown markings*; there is a small patch at the base, *a streak on the fold, one spot in the disc before the middle and one beyond the middle*; the whole wing is also thinly strewn with scattered dusky-brown scales; there are three spots on the costa before the apex and a series on the termen. The hind-wings are pale ochreous.

The larva feeds on dry refuse.

The perfect insect appears from October till April. It has been artificially introduced, being a domestic species. It is also common in Europe, Africa, North America and Australia.

TINEA MOCHLOTA.

(*Tinea mochlotia*, Meyr., Trans. N.Z. Inst., xx., 100.)

(Plate XXXIX, fig. 14 ♂.)

This distinctly-marked little species has occurred at Christchurch, Dunedin, Wyndham, Lake Wakatipu and Invercargill, but is not by any means a common insect.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The forewings are dull ochreous-brown speckled with darker brown; *there is a very oblique cloudy black blotch across the middle of the disc, a small black spot beyond the middle and a large irregular blackish-brown shading on the termen*; the cilia are dull reddish-ochreous, with very broad blackish-brown bars at the apex and tornus. The hind-wings and cilia are dark ochreous-grey, with very slight purplish reflections.

The perfect insect appears in December and January, and is found in forest.

Described and figured from a specimen in Mr. Philpott's collection.

TINEA CONFERTA.

(*Tinea conferta*, Meyr., Trans. N.Z. Inst., xlvi., 115.)

(Plate XXXIX, fig. 13 ♂.)

This dull-looking species has occurred at Wellington and at the Otira River.

The expansion of the wings is about $\frac{1}{2}$ inch. The forewings are elongate-ovate with the cilia around the tornus considerably expanded; *dull orange-brown thickly speckled with dull brown scales, especially on the costal area*; there are three obscure blackish discal spots, two on the fold and one near the middle of the wing. The hind-wings are blackish-brown with very strong purplish reflections.

The larva feeds in the dead branches of *Aristotelia racemosa*, and probably other trees, during the winter and early spring.

The perfect insect appears in December and January, and is found in scrubby forest. It flies freely in the hot sunshine.

TINEA BELONOTA.

(*Tinea belonota*, Meyr., Trans. N.Z. Inst., xx., 99.)

A single specimen of this species was captured by Mr. Meyrick at Palmerston North.

The expansion of the wings of the male is about $\frac{1}{2}$ inch. The fore-wings are rather dark fuscous; a tolerably well-defined ochreous-whitish streak along fold from base to tornus, upper margin with a slight projection before and a stronger one beyond middle, between which is a small dark fuscous spot: cilia rather dark fuscous, purple-shining, tips beneath apex and a small spot beneath tornus ochreous-whitish. Hind-wings with veins 5 and 6 separate; rather dark fuscous, purple-shining, lighter and thinly scaled towards base; cilia fuscous.

Nearly allied to *Tinea mochlotata*, but distinctly broader-winged, and distinguished by the absence of discal spots, clearer pale streak, and different cilia.

The perfect insect appears in March and frequents forest.

I am unacquainted with this species. The above is taken from the original description.

TINEA LINDSAYI.

(*Tinea lindsayi*, Philp., Trans. N.Z. Inst., lvii., 708.)

(Plate LII., fig. 32.)

This very obscurely-marked species was discovered by Mr. S. Lindsay at Mount Grey, Canterbury.

The expansion of the wings is about seven-sixteenths of an inch. The fore-wings are elongate-oblong, dull greyish, with very numerous ill-defined brownish-black transverse streaks; on apical third the spaces between the streaks are more or less clouded with pale purplish-grey; there are two obscure dull golden-brown transverse bands; one from tornus to about $\frac{2}{3}$ of costa and the other immediately before the apex; also three very indistinct blotches of the same colour on dorsum; the cilia are grey barred with darker. The hind-wings and cilia are brown. *The face and palpi are shining white, the rest of head and body dark brown.*

The perfect insect appears in November.

Genus 13.—ASTROGENES, Meyr.

Head with dense loosely-appressed hairs; ocelli posterior; tongue absent. Antennae $\frac{1}{2}$ in σ pubescent, basal joint short, without pecten. Labial palpi rather long, slightly curved, subascending, with appressed scales, second joint rough beneath, with lateral series of rather short bristles, terminal joint as long as second, transversely flattened, obtuse. Maxillary palpi rather long, several-jointed, folded, scaled. Posterior tibiae clothed with hairs above. Fore-wings with vein 2 from towards angle, 7 to costa, 11 from before middle. Hind-wings 1, ovate-lanceolate, cilia nearly 1; 2 widely remote, 3-7 nearly parallel.

Allied to *Tinea*; only one species is known at present.

ASTROGENES CHRYSOGRAPTA.

(*Astrogenes chrysographa*, Meyr., Trans. N.Z. Inst., liii., 335.)

(Plate XXXIV., fig. 14 σ .)

This brilliant little insect has occurred at Waimarino and Wellington in the North Island. In the South Island it has been found on Mount Arthur, at an altitude of 4,500 feet.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The palpi are shining white; the head and body blackish-grey, the thorax having bronzy reflections. The fore-wings are elongate-elliptical, blackish-bronze, sometimes almost black, heavily sprinkled with golden scales in the disc and on the dorsal area; there is a broad longitudinal silver streak from the base to about $\frac{2}{3}$; an outwards-curved transverse silver band just beyond this; about five silver bars on the outer third of the costa; a silver blotch in the disc at $\frac{2}{3}$; an apical patch and five very short silver marks on the termen; the cilia are blackish with long whitish tips. The hind-wings are pale grey broadly clouded with black towards the apex and termen and with strong purplish reflections.

The perfect insect appears in January, and is found in forest and also on the open grassy country above the limit of forest. At Waimarino it was locally abundant amongst *Cordyline*. The resemblance to a typical *Glyphipteryx* is very close in this species.

Genus 14.—PROTHINODES, Meyr.

Head rough. Labial palpi long, curved, second joint shortly tufted, terminal joint compressed, furrowed. Maxillary palpi long, folded. Fore-wings with all veins present. Hind-wings elongate-ovate.

An endemic genus containing two species.

PROTHINODES GRAMMOCOSMA.

(*Tinea grammocosma*, Meyr., Trans. N.Z. Inst., xx., 98.)

(Plate XXXIX., fig. 5 σ .)

This rather distinctly-marked species has occurred at Auckland, Waimarino, Kaitoke, Wellington, Nelson and Otira River.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical with the apex acute and the termen very obliquely rounded; *very pale greyish-ochreous; there are several fine longitudinal brown streaks, extending from the base to the termen or apex, fainter in the disc; two conspicuous black discal dots are situated at about $\frac{2}{3}$ and a very short thick black streak at the apex; there is a series of black marginal dots on the costa beyond $\frac{1}{2}$ and on the termen. The hind-wings are dark grey, with brilliant purple reflections.*

This species varies a little in the distinctness of the longitudinal brown streaks and, in some specimens, there is a thick brown streak running along the dorsum and termen from base to apex.

The perfect insect appears in December and January, and frequents forest. It seems to be attached to the Kie Kie (*Freycinetia*), *Asclepias*, and the Cabbage tree Palm (*Cordyline*), the striped colouring of its fore-wings probably affording it efficient protection when resting on the dead leaves of those plants.

PROTHINODES LUTATA.

(*Prothinodes lutata*, Meyr., Trans. N.Z. Inst., xli., 116.)

(Plate XXXIX., fig. 4 σ .)

This species has occurred at Kaeo, north of Auckland. The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are rather narrow, elliptical with the apex round pointed and the termen oblique; *very pale brownish-ochreous; the costa is narrowly edged with blackish at the base; the dorsum speckled with black and brown scales from the base to beyond $\frac{1}{2}$; there are three unequal blackish spots in the disc beyond the middle; a faint oblique blackish stripe from the*

apex, and a series of apical and terminal dots. The hind-wings are pale grey, with faint purplish reflections.

The perfect insect appears in January, and frequents the faded foliage of the Nikau Palm.

Genus 15.—PROTERODESMA, Meyr.

Head rough. Labial palpi long, curved, second joint rough-scaled beneath, with numerous bristles. Maxillary palpi long, drooping. Fore-wings with 8-11 becoming obsolete near costa and connected by an indistinct subcostal bar. Hind-wings ovate-lanceolate; 6 to costa.

An endemic genus represented by two species.

PROTERODESMA BYRSOPOLA.

(*Proterodesma byrsopola*, Meyr., Sub-antarctic Ilds. of N.Z., I., 74.)

(Plate XXXVII, fig. 17 ♂; 18 ♀.)

This interesting species was originally discovered at Auckland Island during the scientific expedition of November, 1907, but Mr. Philpott has since found it at Invercargill and at Orepuke.

The expansion of the wings is considerably over $\frac{1}{2}$ inch. The fore-wings are elongate-elliptical with the termen very obliquely rounded; ochreous more or less speckled with brown, except on the veins and towards the costa and dorsum; there is a broken black line on the fold; a broad, dark brown longitudinal streak in the disc from the base to about $\frac{2}{3}$, thence deflected towards the tornus and an indistinct blackish discal mark. The hind-wings are greyish-ochreous very faintly tinged with purple. In the female the body is very much larger and heavier and the wings relatively narrower and more pointed, the insect thus clearly approaching a semi-apterous condition; the general colouring is darker and duller, the brown speckling being more extensive, and the discal mark darker and more distinct than in the male.

This species varies considerably in the distinctness of the markings.

The perfect insect appears from October till January. At Auckland Island it was found in the rata forest, resting on the rough undersurface of dead logs lying on the ground. I have never observed either sex on the wing and it is perhaps doubtful if the female is able to fly. Mr. Philpott has taken this species on Longwood Range, at an altitude of 3,000 feet above the sea-level.

PROTERODESMA MYSTICOPA.

(*Tinea mysticopa*, Meyr., Trans. N.Z. Inst., xvi., 115.)

(Plate XL, fig. 17 ♀.)

This species has occurred at Greymouth, Dunedin and Invercargill. It is also found on the Chatham Islands.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are rather narrow with the apex slightly rounded and the termen oblique; ochreous, heavily speckled and clouded with brown, except on a wide irregular streak along the basal portion of the dorsum; there is a series of elongate black marks on the fold, and another series in the disc beyond the middle. The hind-wings are pale ochreous tinged with dusky brown along the termen.

Varies somewhat in the brown and ochreous colouring, which is much brighter in some specimens than in others.

The perfect insect appears from September till December, and frequents forest.

Genus 16.—TRITHAMNORA, Meyr.

Head rough. Labial palpi moderate, porrected, second joint rough-scaled beneath. Maxillary palpi long, drooping. Fore-wings with sub-dorsal tufts; all veins present. Hind-wings elongate-ovate.

Another endemic genus containing one species.

TRITHAMNORA CERTELLA.

(*Tinea certella*, Walk., Cat. xxviii., 484; *Trithamnora improba*, Meyr., Trans. N.Z. Inst., xiv., 29.)

(Plate XLVI, fig. 15 ♂, 16 ♀.)

This very dark-looking insect has occurred at Wellington.

The expansion of the wings of the male is about $\frac{1}{2}$ inch, of the female nearly $\frac{1}{2}$ inch. The fore-wings are rather elongate with the cilia expanded at the tornus, very rich brownish-black with a large black patch on the costa extending from the base to $\frac{2}{3}$ but not reaching the dorsum; there is a series of tufts of dull yellowish raised scales along the lower edge of the costal patch which itself is strongly waved; the cilia are blackish-brown, narrowly barred with dull white. The hind-wings are deep brownish-black, darker towards the apex. The female is considerably larger and much paler in colour than the male, with the basal $\frac{1}{2}$ of the fore-wings (except along the dorsal edge) deep chocolate-brown. The hind-wings are pale greyish-ochreous, with very faint purplish reflections.

This species was at one time confused with *Tinea conferta*, but is a much darker and more richly-coloured insect; the patches of raised yellowish-scales also constitute a good distinction.

The perfect insect appears in November, December and January, and frequents dark forests. When at rest with closed wings, this species is manifestly protected by its resemblance to bark, the tufts of raised scales on the fore-wings are then very conspicuous and certainly give the impression of minute lichens growing on the bark.

Genus 17.—LYSIPHAGMA, Meyr.

Head loosely scaled. Labial palpi curved, ascending, second joint with rough projecting scales beneath, terminal joint broadly flattened. Maxillary palpi long, drooping. Fore-wings with subdorsal tufts; all veins present. Hind-wings elongate-ovate, transverse vein sometimes absent between 3 and 4. (Plate K., figs. 31, 32, 33 neurulation and head of *Lysiphagma epixyla*.)

An endemic genus containing three species.

LYSIPHAGMA MIXOCHLORA.

(*Lysiphagma mixochlora*, Meyr., Trans. N.Z. Inst., xx., 105.)

(Plate XXXIX, fig. 9 ♂.)

This very pretty green species has occurred in the North Island at Auckland, Makotuku, Kaitoke and Wellington, and in the South Island, on the Lyttelton Hills.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings, which have the costa strongly arched and the termen obliquely rounded, are rather dull pale green more or less mottled with brighter green; there is a very conspicuous tuft of black scales on the dorsum near the base followed by a series of short black streaks and a smaller tuft of rusty red scales; a series of short black bars is situated on the costa and a conspicuous cream-coloured patch near the apex, bordered with blackish-brown towards the base; there is a terminal series of blackish dots and a number of brown bars on the cilia. The hind-wings are white,

very broadly clouded with shining golden brown towards the termen; the transverse vein is absent.

The larva feeds under the bark of dead karaka trees (*Corynocarpus laevigata*) and in habits and general appearance closely resembles the larva of *L. epixyla*.

The perfect insect appears in December, January and February, frequenting dense forests, where it is hard to see and rarely met with. When resting on tree trunks it stands on the fore- and intermediate legs, the wings forming a steep but narrow roof; the antennae are held backwards extending along the middle of each wing; both of the large tufts of raised scales on the dorsum of the forewings are in contact, forming together two large lappets on the mid-back, and constituting a most distinctive character in the resting insect; the apex of the closed wings comes to a sharp point, the head end being broad and blunt. The entire insect, of course, closely resembles a small moss- or lichen-covered twig, but possibly something more special is aimed at as its general appearance in repose is very remarkable.

LYSIPHAGMA EPIXILA.

(*Lysiphagma epixyla*, Meyr., Trans. N.Z. Inst., xx., 105.)

(Plate XXXIX., fig. 10 ♀; Plate III., fig. 30 larva.)

This very interesting species has occurred at Waimarino, Ohakune, Wellington, Greymouth, Christchurch, Lake Wakatipu and Invercargill.

The expansion of the wings varies from slightly over $\frac{3}{4}$ inch to $1\frac{1}{2}$ inches. The forewings, which are rather elongate with the costa strongly arched and the dorsum concave near the tornus, are pale brownish-ochreous densely spotted with dark brown with a few scattered blackish streaks; there are very obscure brown patches near the middle and before the apex and, in the male, a large irregular pale ochreous patch almost touching the apex; a large tuft of raised scales is situated near the base, a small one near the dorsum at $\frac{1}{3}$, a third on the fold near the middle and a fourth above the tornus; the cilia are brown, obscurely barred with pale ochreous-brown. The hindwings are pale brownish-ochreous, slightly clouded with darker brown towards the apex and termen; the transverse vein is present.

Considerable variation exists in the depth and extent of the light and dark markings, but the species may always be easily recognised.

The larva feeds under the bark of dead pukatea trees (*Laurelia novae-zelandiae*) and also in fuchsia trees (*Fuchsia excorticata*). Its length when full-grown is about 1 inch. The head is bright reddish-brown; the second segment horny polished yellowish-brown; segments 3 and 4 are greyish-ochreous with a single row of minute warts and long bristles; the rest of the body is dull whitish-ochreous; each segment, except the last, having two elongate dorsal plates and five minute greyish lateral plates; the dorsal plates each have two warts and the lateral plates one wart, every wart emitting a long bristle; the terminal segment is dull brown with many bristles.

The pupa is enclosed in a loose cocoon of silk and frass amongst the decayed wood.

Mr. Philpott states that, in the Invercargill district, this larva feeds under the bark of dead broad-leaf trees (*Griselinia littoralis*) and the cocoons of the pupa may be found in similar situations.*

The perfect insect appears from the beginning of November until the middle of January, and frequents dense forests, but is not often met with. When found, it is usually observed resting on tree trunks, where its general colouring, combined with the raised scales on the forewings, makes it extremely inconspicuous. The resemblance to an excrescence on the bark is very close and hence the moth is, no doubt, often overlooked.

LYSIPHAGMA HOWESII.

(*Lysiphagma howesi*, Quail; Trans. N.Z. Inst., xxxiii., 154; Plate VIII.)

(Plate XXXIX., fig. 8 ♂.)

This very obscurely-marked species, which was discovered by Mr. George Howes, appears to be confined to the South Island. It has occurred at Christchurch, Glenorchy and Paradise near Lake Wakatipu, and at Invercargill.

The expansion of the wings is about $\frac{3}{4}$ inch. The forewings, which have the costa slightly arched, are very pale greyish-green thickly speckled with blackish-grey spots which are faintest near the middle of the wing; there are dense clusters of such markings on the dorsum at about $\frac{1}{3}$ and $\frac{2}{3}$, and a conspicuous crescentic mark near the apex enclosing a cream-coloured patch; a series of blackish marks is situated on the costa. The hindwings are pale grey, darker towards the termen; the transverse vein is present.

The larva, which feeds in decayed ribbon wood (*Gaya Lyallii*), has the head broad, smaller than the prothorax, sloping from base to front which is produced and, viewed laterally, snout-like. The thoracic segments are larger than the abdominal, which latter taper gradually to the anus. The head is dark brown; the thoracic dorsal plates brown, that of the prothorax paler on the anterior edge. The other segments are oily white with brown tubercles. The legs are pale brown and semi-transparent. (Quail.)†

The pupa is enclosed in a rather tough cocoon amongst the decayed wood.

The perfect insect appears in November and December, and frequents forests.

Genus 18.—LINDERA, Blanch.

Head with dense appressed scales; tongue obsolete. Antennae nearly 1, in ♂ simple. Labial palpi moderately long, curved, ascending, second joint thickened with dense scales, terminal joint as long as second, stout, tolerably pointed. Maxillary palpi obsolete. Forewings with 16 furcate, 2 from angle, 7 and 8 stalked, 7 to costa, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$; 2-4 parallel, 5 and 6 stalked, 7 separate.

Represented in New Zealand by one species, probably of South American origin.

*Trans. N.Z. Inst., xxxlii., 183.

†Trans. N.Z. Inst., xxxlii., 154-158 where detailed microscopical descriptions of the insect are given in the larva, pupa and imago condition.

LINDERA TESSELLATELLA.

(*Lindera tessellatella*, Blanch., Faun. Chil. vii., 106 (1852); *bogotatella*, Walk. Cat. xxix., 785 (1864) *Scymnophora calicularis*, Meyr., Trans. Roy. Soc. S. Austr., 1906, 66.)

(Plate L., fig. 24 ♂.)

This species has occurred at Nelson and Wanganui.

The expansion of the wings of the male is almost 1 inch; of the female 1½ inches. The fore-wings are dull whitish-ochreous with several large dull-grey spots in the disc and one below the apex; there is a series of small grey spots around costa and termen. The hind-wings are pale slaty-grey. All the cilia are dull whitish-ochreous.

The larva feeds on refuse.

The perfect insect is evidently domestic in its habits. It has been taken in January, April, May, June and December. Mr. Philpott informs me that it is now not uncommon at Nelson. A description of the genitalia of this insect appears in the Proceedings of the Linnean Society of New South Wales, vol. 50, part 2, pp. 32-34.

Genus 19.—TITANOMIS, Meyr.

Head shortly rough-haired; tongue well developed. Labial palpi moderate, subascending, second joint shortly rough-scaled beneath, terminal joint short, stout. Maxillary palpi long, folded. Thorax with slight crest, densely short-haired beneath. Fore-wings with veins 3 and 4 stalked, 7 to termen. Hind-wings over 1, oblong-ovate.

An endemic genus of exceptional interest. It contains two species, the largest Tineids we have in New Zealand.

TITANOMIS SISYROTA.

(*Titanomis sisyrota*, Meyr., Trans. N.Z. Inst., xx., 104.)

(Plate XXV., fig. 28 ♀.)

This very interesting species may be recognised by its gigantic size as, with the exception of the next species, no other New Zealand Tineid approaches it in this respect. It is extremely rare and uncertain in its appearance. The earliest capture definitely recorded was made by Mr. Helms at Greymouth in December, 1874, and specimens were taken at Nelson, probably about the same time. The type specimen in Mr. Meyrick's collection was captured in Nelson in 1882; specimens were also taken in Blenheim in 1883, at Otaki in 1886, at Nelson in 1898, and at Haldane, Southland, in 1900. Nothing was again heard of the insect until February 1921, when a fine female specimen was taken at light by Mrs. H. Hamilton at Rangataua, near the base of Mount Ruapehu.

The expansion of the wings of the male is 2½ inches, of the female 2½ inches. The fore-wings of the female are oblong, with the costa slightly arched, the apex rounded and the termen slightly oblique; greyish-black; there is a very broad wavy speckled whitish band along the termen and dorsum; a black stripe along the fold; a second black stripe above this traversing the disc; several short black stripes on the veins near the apex; an oval white spot on the fold and a smaller round white spot in the disc beyond the middle. The hind-wings are dark grey.

In the collection of New Zealand Lepidoptera formed by the late Mr. A. P. Buller and now in the Dominion Museum, there is a male specimen of this insect. It is unfortunately in a very damaged condition, but appears to indicate that the general colouring in the male is consid-

erably paler than in the female, with a much more extensive area of pale grey and white scales, especially on the dorsum. There is a distinct blackish streak in the middle of the wing from the base to $\frac{1}{2}$ and a less distinct streak below the costa from about $\frac{1}{3}$ to $\frac{2}{3}$. No record of the capture of this specimen exists and, so far as I am aware, it is the only male extant.

The perfect insect appears from December till March, and all the specimens, of which records have been preserved, were captured at light.

TITANOMIS TETRAGONA.

(*Titanomis tetragona*, Huds., Ent. Mo. Mag., liv., 62.)

(Plate XLIV., fig. 18' ♂.)

With the exception of the last species, this handsome insect is the largest Tineid at present known in New Zealand. It was discovered on Mount Egmont in January 1917, at an altitude of about 3,000 feet above the sea-level.

The expansion of the wings of the male is fully 2½ inches. The fore-wings are oblong with the costa strongly arched; deep purplish-brown obscurely mottled with darker and with faint bronzy reflections; there is a large irregular patch of paler scales in the disc near the base; a large dull whitish triangular patch on the tornus, its apex almost reaching the costa; this patch is thickly streaked with grey; the terminal area is clouded with warm purplish-brown; there is a very conspicuous, almost square, pinkish-ochreous blotch on the costa immediately before the apex. The hind-wings are pale ochreous very heavily dappled with grey. All the cilia are ochreous with pale greyish-brown basal line and tips. The head is ochreous, the thorax pale purplish-brown and the abdomen dark greyish-ochreous.

The perfect insect appears in January and may be looked for in sub-alpine forests. It is attracted by light.

Described and figured from the unique specimen in Mr. Watt's collection.

Genus 20.—TALEPORIA, Hübn.

Head rough. Labial palpi moderate, porrected. Maxillary palpi obsolete. Fore-wings with vein 7 to termen, 7 and 8 sometimes stalked. Hind-wings elongate-ovate, 2.7 separate. Female apterous.

A small European genus of which three species are known in New Zealand. The larvae feed on lichens.

TALEPORIA APHROSTICHA.

(*Taleporia aphrosticha*, Meyr., Trans. N.Z. Inst., xlv., 123.)

(Plate XXXIX., fig. 7 ♂.)

This very interesting species was discovered by Mr. Philpott on the Hump Ridge, Southland, at an elevation of about 3,500 feet.

The expansion of the wings is slightly over ½ inch. The fore-wings are dull greyish-ochreous, finely mottled with darker grey; there is a large irregular white blotch in the middle of dorsum, and several roundish spots on each side of this; two almost confluent white spots in disc above middle; a series of round spots along termen and apical third of costa; all the white markings are more or less strongly margined with blackish, especially those towards dorsum; the cilia are pale ochreous, barred with blackish-grey. The hind-wings are dull greyish-ochreous, with golden reflections towards the margins.

The female is stated to be apterous.

The perfect insect appears in December and is found on open mountain country.

I am much indebted to Mr. C. E. Clarke for the loan of a very perfect specimen of this species, from which I have been enabled to prepare the figure and description here given.

TALEPORIA CAWTHONELLA.

(*Taleporia cawthonella*, Philp., Trans. N.Z. Inst., liii., 341.)

(Plate XLVIII., fig. 9 ♂.)

This very distinctly-marked little species was discovered by Mr. Philpott, in the Maitai Valley at Nelson, to whom I am indebted for specimens and all information.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings are very pale shining ochreous with blackish markings; there are two elongate bars on the basal half of the costa and four almost round spots on the apical half, a series of very indistinct blackish marks along the termen and one larger and more distinct mark near the middle of the dorsum; there is a cloudy blotch in the disc beyond the middle and the whole wing is very thinly sprinkled with greyish scales. The hind-wings are pale grey.

The larva inhabits a case constructed of the fragments of a species of white lichen. The case is irregularly pyriform in shape, rough on the surface, and, when containing a full-grown larva, about $\frac{1}{4}$ inch long by about $\frac{1}{8}$ inch broad. It is a rather fragile shelter, being easily pulled to pieces. In travelling, the head and thorax are projected from the case, and when a foothold is secured the case is lifted clear of the surface and drawn forward. Should the case catch on a projection an extra high lift is given to clear the obstacle. The larvae began to pupate about the end of June, the first moth appeared on the 3rd August, and emerging continued till the middle of October. When preparing for pupation the larva attaches the apex of its case to the surface of a stone or the stem or leaf of some plant. The attachment is not rigid, but permits the case to swing in all directions. The head of the pupa is well separated from the thorax, and the legs reach quite to the extremity of the abdomen. On the dorsal surface of the last abdominal segment there is a transverse row of stout recurved spines; these probably serve to keep the pupa from slipping from the case when the emergence of the imago is taking place.

TALEPORIA MICROPHANES.

(*Mallobathra microphanes*, Meyr., Trans. N.Z. Inst., xx., 103.)

(Plate XXXVII., fig. 10 ♂, Plate III., fig. 12 larva in case.)

This very small species has occurred at Wellington, Christchurch, Dunedin, Ida Valley, Central Otago and Lake Wakatipu.

The expansion of the wings of the male is about $\frac{1}{2}$ inch. The fore-wings are narrow with the costa straight, the apex rounded and the termen very obliquely rounded; dark greyish-black with very vivid purple reflections, especially in fresh specimens; there are three oblong golden-yellow spots on the costa and a series of much smaller marginal spots along the termen and dorsum as well as a few scattered spots in the disc. The hind-wings are pale grey. The female is completely apterous and closely resembles that of *S. conisatilis*. It is furnished with

a tuft of hairlike scales at the end of the body which is, no doubt, used for covering the eggs.

The larva constructs a conical-shaped moveable case of grey lichen, living therein during the summer and autumn, and feeding on the minute grey lichens growing on the trunks of trees in the forest. When the larva is resting the end of the case is firmly attached to the tree trunk by silken threads and in this position it is most inconspicuous.

The perfect insect has been bred from the cases in July and August. It has been captured in August and November, and is most likely about during the late winter and very early spring, but owing to its small size and dark colouring is, no doubt, often overlooked.

Genus 21.—MALLOBATHRA, Meyr.

Head loosely haired. Labial palpi moderate or short, porrected. Maxillary palpi obsolete. Fore-wings, with 6 seldom absent, 7 to termen, 7 and 8 stalked. Hind-wings elongate-ovate, 6 sometimes stalked with 7 or absent. Female winged. (Plate K., figs. 34, 35, 36 neuration and head of *Mallobathra homalopa*.)

This genus comprises a number of day-flying moths, generally of obscure coloration, with hair-like scales attached loosely to the wings which are thus especially liable to become abraded. The accurate specific determination of indifferent specimens is a most difficult matter, and future progress will probably be chiefly attained by breeding the insects from the extremely interesting and varied cases constructed by the larvae. Although the perfect insects are in themselves unattractive, the general interest of their habits, and especially the constructive skill of their larvae in making movable protective habitations, offer ample compensations to the student for the lack of striking characters exhibited by the imago.

We have ten species belonging to this endemic genus, of which two are restricted to the North Island, five to the South Island, and three occur in both islands.

MALLOBATHRA ARANEOSA.

(*Mallobathra araneosa*, Meyr., Trans. N.Z. Inst., xlvii., 117.)

(Plate XXXIX., fig. 6.)

This extremely fragile-looking species was discovered by Mr. Philpott on The Hump, Southland, at an altitude of about 3,000 feet above the sea-level. It has also occurred at Dunedin, on Ben Lomond Lake Wakatipu, and on Longwood Range and the Hunter Mountains.

The expansion of the wings is considerably under $\frac{1}{2}$ inch. The fore-wings are elongate, narrow with the apex round-pointed and the termen very oblique; very pale brownish-ochreous; the basal third is faintly clouded with pale grey and there are two series of faint grey spots crossing the outer portion of the wing; the principal veins are also marked in grey. The hind-wings and cilia are very pale whitish-grey.

The perfect insect appears in February and is found on the edges of beech forests (*Nothofagus*). It may be easily recognised by its semi-transparent and extremely attenuated appearance.

MALLOBATHRA FRAGILIS.

(Mallobathra fragilis, Philp., Trans. N.Z. Inst., lvii., 708.)

(Plate LII., fig. 6.)

This fragile-looking little species was discovered by Mr. S. Lindsay at Riccarton Bush, near Christchurch.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are elongate-elliptical, with the apex and tornus rounded; pale grey, irregularly sprinkled with small clusters of darker grey scales; a narrow blackish suffusion on costa at base; a rather large blackish spot on costa near middle, and a smaller spot at $\frac{1}{2}$; a series of ill-defined blackish spots around apex and along termen. The hind-wings are pale grey; the cilia of all the wings are grey.

The perfect insect appears in October.

Described and figured from a specimen submitted by Mr. Philpott.

MALLOBATHRA METROSEMA.

(Mallobathra metrosema, Meyr., Trans. N.Z. Inst., xx., 103.)

(Plate XLVI., fig. 5 ♂.)

This species was discovered by Mr. Meyrick at Christchurch in 1882. It has also occurred on the sea-coast near Wellington.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are pale warm brownish-ochreous with darker brown markings; there is an indistinct blotch on the costa before the middle and a fainter blotch beyond the middle; a conspicuous blotch on the middle of the dorsum; the whole of the costal and apical portions of the wing are very sparsely strewn with minute brown marks. The hind-wings are greyish-ochreous, clouded with warm ochreous-brown towards the apex. The antennal ciliations are about four times the breadth of the stalk.

The perfect insect appears in September.

Described and figured from one of the original specimens kindly given to me by Mr. Meyrick.

MALLOBATHRA ILLUSTRIS.

(Mallobathra illustris, Philp., Trans. N.Z. Inst., xlix., 245.)

(Plate XLVI., fig. 17.)

This very distinct species was discovered by Mr. Philpott on The Hump, Southland, at an elevation of about 3,000 feet above the sea-level.

The fore-wings are pale purplish-grey, clouded with blackish-grey on the terminal area; there is a large triangular creamy white blotch on the middle of the dorsum, its apex reaching the disc; a smaller blotch on the tornus; two whitish spots obliquely placed near the termen and three obscure whitish bars on the costa; the cilia are dull grey with a broad white patch in the middle of the termen and at the tornus. The hind-wings are pale brownish-grey, with pale grey cilia.

The perfect insect appears from December till February.

Described and figured from a specimen in Mr. Philpott's collection.

MALLOBATHRA LAPIDOSA.

(Mallobathra lapidosa, Meyr., Trans. N.Z. Inst., xli., 117.)

(Plate XXXIX., fig. 15 ♂, 16 ♀; Plate III., fig. 11 larva in case; 10 ditto withdrawn from case.)

This species, which is very closely allied to *Mallobathra homalopa*, has occurred at Wellington.

The expansion of the wings of the male is about $\frac{1}{2}$ inch; of the female seven-sixteenths of an inch. The fore-wings of the

male are dark brown with coppery reflections and the veins obscurely marked in darker brown; there are several very small pale yellowish marks on the dorsum; the hind-wings are dark greyish-brown with coppery reflections. The antennae are strongly dentate with long ciliations. The female has the fore-wings golden-ochreous with a series of broad purplish-brown bars on the costa; the rest of the wing is thickly mottled with purplish-brown. The hind-wings are grey. The extremity of the abdomen is furnished with a very large tuft of hair-like scales, which are used by the female to cover her eggs immediately they are laid.

The larva feeds on moss growing on tree trunks. It constructs a portable conical case of shaggy moss in which it lives during the spring and early summer. These cases are very hard to see amongst the moss and must afford the larvae efficient protection against enemies. The length of the larva when full-grown is about $\frac{1}{2}$ inch; the head and thoracic segments are very stout and horny; the head is light brown and the anterior edge of the second segment also brown; the rest of the thoracic segments are dark metallic bronzy-green; the legs are large and strong; the rest of the body is very pale dull greenish-ochreous with the surface much ridged and wrinkled, the summits of the ridges pale bronzy-green; the anal segment is rich bronzy-green; there are minute ventral prolegs on segments 7, 8 and 9 only; the anal proleg is large and strong, and is no doubt used to retain the larva in its case.

Before the change into the pupa state takes place, the case is firmly attached by its anterior end to the tree-trunk and both apertures closed up, the moth finally forcing its way out of the posterior end of the case.

The perfect insect appears in December and January. At present it has only been bred from the cases.

MALLOBATHRA CRATAEA.

(Mallobathra crataea, Meyr., Trans. N.Z. Inst., xx., 102; strigulata, Philp., ib., lv., 214; fenwicki, Philp., lv., 214.)

(Plate XL., fig. 2 ♂.)

This species is very common in the neighbourhood of Wellington. It has also occurred around Nelson and Invercargill.

The expansion of the wings of the male is slightly over $\frac{1}{2}$ inch; of the female fully $\frac{3}{4}$ inch. The fore-wings of the male have the costa arched beyond the middle, the termen oblique and the tornus pronounced; bronzy-purplish-brown faintly spotted with dull golden-ochreous; there is a large blackish spot on the middle of the dorsum followed by a pale yellow spot towards the tornus. The hind-wings are dark grey with bronzy reflections. In the female the arching of the costa is less pronounced; the general colour paler and the golden-ochreous spots more numerous. The hind-wings are pale grey.

Varies considerably both in size, and in depth and intensity of markings. A very dark form is ranked by Mr. Philpott as a distinct species, under the name of *Mallobathra fenwicki*. The wing scales are most liable to be rubbed off and hence it is extremely difficult to obtain really good specimens for the cabinet.

The egg is about one-fortieth of an inch in length, elongate-oval, white, without any trace of sculpture.

The perfect insect appears from about the middle of September until the middle of October. The male flies very rapidly, in hot sunshine, often winging his way over the tops of the bushes, and several individuals may frequently be seen thus engaged at the same time. The female is much more sluggish and must be specially searched for on the bushes, around which the males are noticed to be the most numerous. Freshly-emerged specimens of this sex are furnished with a large anal tuft of hair-like scales. These scales are very easily detached, being used by the female as a covering for her eggs when they are first deposited. This species is usually one of the first insects to greet the collector in the early spring.

MALLOBATHRA SCORIOTA.

(*Mallobathra scoriota*, Meyr., Trans. N.Z. Inst., xli., 16.)

This species has occurred at Wellington and at Invercargill.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are elongate with the costa gently arched, apex obtuse, termen very obliquely rounded; vein 6 present; whitish-brown, strewn with cloudy dark brown strigulae; a moderately broad, slightly oblique dark brown median band; a cloudy dark brown spot on costa at $\frac{1}{2}$; the confluence of the strigulae tends to form suffused spots in disc towards apex, and along termen; cilia whitish-brown, with dark brown ante-median shade and indistinct bars on basal third. Hind-wings with vein 6 present; grey; cilia grey.

I am unable to identify this species. The above is taken from the original description.

MALLOBATHRA PERISSEUTA.

(*Mallobathra perisseuta*, Meyr., Trans. N.Z. Inst., lli., 32.)

(Plate XLVII., fig. 16 ♀.)

This species was discovered by Mr. Clarke at Opoho, near Dunedin.

The expansion of the wings is about nine-sixteenths of an inch. The fore-wings, which have the apex rounded and the termen oblique, are pale dull ochreous-brown with indistinct blackish-brown markings; there is a large spot in the middle of the dorsum; two ill-defined discal spots and a series of faint streaks across the apical area. The hind-wings are bronzy-brown, darker towards the termen.

Distinguished from all similar species by the very rounded outline of the fore-wings.

The perfect insect appears in October and November, and frequents manuka scrub.

Described and figured from specimens kindly given to me by Mr. Clarke.

MALLOBATHRA HOMALOPA.

(*Mallobathra homalopa*, Meyr., Trans. N.Z. Inst., xxiii., 100.)

(Plate XXXIX., fig. 12 ♂.)

This rather dull-looking insect is very common in the Wellington District.

The expansion of the wings of the male is nearly $\frac{5}{8}$ inch; of the female $\frac{1}{2}$ inch. The fore-wings are bright bronzy-brown with strong coppery reflections; there are numerous small ill-defined darker brown spots tending to form transverse lines. The hind-wings are dark greyish-brown with strong coppery reflec-

tions. In the female the wings are narrower, the darker markings more distinct, and the hind-wings greyer, than in the male.

The larva constructs a case, about $\frac{1}{2}$ inch long, covered with short fragments of dead grass and other litter, arranged rather irregularly, but, mostly placed longitudinally, after the manner of thatch. Three or four much longer pieces of grass are often attached to the case and this greatly increases its protective value, rendering its detection, as a case, a matter of great difficulty. About the end of August, when the larvae are full grown, the cases are attached, by their upper end, to the under surface of logs, particularly those of an irregular shape which do not rest evenly on the surface of the ground and allow plenty of air space underneath. When thus attached the cases look exactly like little tufts of grass sticking to the log. They are often very abundant, as many as half a dozen cases being sometimes found under a single log.

The perfect insect appears from October till December. The male flies freely in open glades amongst scrubby forest, and is most active in the hot afternoon sunshine. The female is, however, very seldom observed and specimens of this sex are best obtained by collecting the cases and hatching them out in captivity. As in *M. lapidosa* and *M. crataea*, the female is provided with a large anal tuft of scales which she uses to cover her eggs when first deposited.

Mr. Philpott informs me that the insect met with in Southland is not *M. homalopa*, but an extremely similar species, which he proposes to name and describe later.

MALLOBATHRA GLOBULOSA.

(*Mallobathra globulosa*, Meyr., Trans. N.Z. Inst., xlv., 117.)

(Plate XXXIX., fig. 11 ♂.)

This interesting species was discovered by Mr. Philpott near Invercargill.

The expansion of the wings is $\frac{1}{2}$ inch. The antennae of the male have very long ciliations. The fore-wings have the costa slightly arched at the base; pale golden ochreous with purplish-brown markings; there are two large costal blotches at about $\frac{1}{3}$ and $\frac{2}{3}$, the first extending half-way across the wing; two similar patches on the dorsum, one near the middle, the other just before the tornus; a small discal dot at about $\frac{1}{4}$ and a confluent series of terminal spots. The hind-wings are bronzy-grey.

The perfect insect appears in September, and is found amongst undergrowth in pine forests.

Described and figured from specimens kindly given to me by Messrs. Howes and Philpott.

Genus 22.—NARYCIA, Steph.

Head shortly rough-haired. Antennae $\frac{1}{2}$ in male ciliated. Labial palpi rather short, loosely scaled. Maxillary palpi obsolete. Fore-wings with veins 7 and 8 stalked or coincident, 7 to apex or termen. Hind-wings 1, elongate-ovate 2-7 nearly parallel.

Largely represented in Australia, and also occurs widely in India and Africa.

The larvae usually feed in portable cases on lichens.

Only one species is known in New Zealand at present.

NARYCIA PETRODOXA.

(Narycia petrodosa, Meyr., Trans. N.Z. Inst., Hv., 169.)

(Plate XLIX., fig. 26 ♀.)

This large and conspicuous species has occurred in the upper part of the Otira Gorge, about 2,500 feet above the sea-level.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. The fore-wings, which have the apex and tornus rather rounded, are pale yellow with purplish-black markings; there are three bars on the costa near the base and a number of small slender marks on the basal area; a large rectangular spot in the middle of the dorsum; a large bifurcate blotch in the middle of the costa; an irregular mark on the tornus and an oblong blotch on the subterminal area; between these spots and along the costa there are several fine broken wavy lines; the cilia are blackish with purple reflections. The hind-wings are brownish-grey with purple reflections.

The perfect insect appears in December, and may be looked for in sunny glades amongst sub-alpine scrub.

Genus 23.—SCORIODYTA, Meyr.

Head loosely haired. Labial palpi moderate, porrected. Maxillary palpi obsolete. Fore-wings with vein 7 to costa. Hind-wings elongate-ovate, 2-7 separate. Female apterous. (Plate K., figs. 28, 29, 30 neurulation and head of *Scoriodyta conisalia*.)

An endemic genus containing one species.

SCORIODYTA CONISALIA.

(Scoriodyta conisalia, Meyr., Trans. N.Z. Inst., xx., 102.)

(Plate XXXVII., fig. 11 ♂; fig. 12 ♀ resting on larval case;

Plate III., fig. 33 larva in case; fig. 34 ditto withdrawn from case.)

Although the remarkable spindle-shaped little cases, constructed by the larva of this species, are often very abundant on fences and tree-trunks in Wellington and the surrounding country, the perfect insect is very seldom observed. Cases have, however, also been detected at Kaeo in the extreme north, and it is therefore probable that the insect is generally distributed throughout the North Island.

The expansion of the wings of the male is $\frac{3}{4}$ inch. The fore-wings have the apex obtuse and the termen obliquely rounded; grey, irregularly mottled and speckled with darker grey; there are usually two indistinct paler spots on the dorsum near the middle; one near the tornus and a series of faint, whitish terminal dots; two cloudy bands are situated on the costa beyond the middle. The hind-wings are grey.

The female is completely apterous; pale ochreous with the dorsal and ventral segmental plates dark brown and horny and a row of fine bristles along the edge of each segmental division, the terminal portion of the abdomen being alone clothed with scales, which are probably used to cover the eggs when laid, the same as in *Mallobathra*. After emergence the female stands quite motionless on the old larval case, often for some days, evidently awaiting the arrival of the winged male.

The larva constructs a portable sub-cylindrical case in which it lives during most of the year, becoming full-grown towards the end of the winter. This case is oval, tapering at each end; it is formed of tough silk and covered on the outside with minute stones, dust, or vegetable refuse but

very smooth inside. The anterior aperture consists of a loose silken tube which can be closed by the larva from within. During pupation the case is firmly attached to a vertical object, both ends being closed up. The length of the contained larva is about $\frac{1}{4}$ inch; the head is black and shining with a few bristles; the second and third segments, black chitinous and highly polished, with whitish anterior margins; the rest of the body is dull ochreous, or greenish-white, with the central portions darker; the thoracic legs are strong and well developed; the abdominal prolegs rudimentary, but the anal prolegs are very large and used by the larva to retain its hold on the case.

In dry weather these larvae secrete themselves and their cases in crevices, those living on fences often hiding themselves between the boards. In damp weather, however, these little cases may be seen spread over the fence in all directions, the larvae dragging them out of their hiding places in order to feed on the minute green algae (*Pleurococcus vulgaris*) which grow on the fencing boards, or tree-trunks, almost immediately after rain. This larva feeds throughout the winter, the wet weather then prevailing evidently favouring the growth of its food-plant. The pupa state is assumed about September.

The perfect insect appears in October and November.

Sub-family 16.—NEPTICULIDÆ.

Head roughly tufted. Basal joint of antennae forming an eyecap. Labial palpi short, drooping. Maxillary palpi long, folded. Fore-wings with cell open, veins 3-5 absent, 9 absent. Hind-wings lanceolate, cell open, 3-5 absent; frenulum multiple in both sexes.

These minute insects are so generally overlooked that their distribution is little known, but they occur in all regions.

Genus 1.—NEPTICULA, Heyd.

This genus comprises the smallest known species of Lepidoptera; the perfect insects are immediately recognised by the rough head and face, and folded palpi. The shortness of the antennae is also an important feature, they rarely exceed half the length of the anterior wings; the anterior wings are short and comparatively broad and clothed with scales of extraordinary size, considering the smallness of the insect. The larvae are especially distinguished by the absence of true horny legs and the undeveloped condition of the membranous legs which here serve alike for legs and prolegs. The pupa has the parts of the future insect far more conspicuously displayed than is usual in the pupae of Lepidoptera; it is always contained in a cocoon.

The larvae of the European species, which have been well studied, mine leaves eating out a long tortuous track between the layers of the leaf which is clearly visible from without. Such mined leaves may be collected and the moths reared in captivity. The perfect insects are very seldom observed, although a few stray specimens have been taken by sweeping foliage. Eleven species are known in

New Zealand at present, of which two are restricted to the North Island, six to the South Island, and three occur in both islands. It is, however, practically certain that many others remain to be discovered. The genus offers an excellent field for the keen entomologist, and in this connection special mention should be made of the valuable work already done by Mr. Morris N. Watt.

NEPTICULA TRICENTRA.

(*Nepticula tridenta*, Meyr., Trans. N.Z. Inst., xxi., 187.)

One specimen of this species was taken by Mr. Meyrick at Christchurch.

The expansion of the wings of the female is about $\frac{1}{4}$ inch. Head and palpi grey-whitish. Antennae, thorax, and abdomen grey. Legs dark grey, apex of joints whitish. Fore-wings lanceolate; pale grey, irrorated with darker; two or three small round black dots in an irregular longitudinal series towards middle of disc; cilia light grey. Hind-wings and cilia light grey.

The perfect insect appears in March.

I am unacquainted with this species. The above is a copy of the original description.

NEPTICULA OGYGIA.

(*Nepticula ogygia*, Meyr., Trans. N.Z. Inst., xxi., 187.)

A single specimen of this species was captured by Mr. Meyrick at Dunedin and Mr. Morris N. Watt has found it on Mount Egmont.

The expansion of the wings of the male is slightly over $\frac{1}{4}$ inch. Head and palpi pale whitish-ochreous. Antennae grey. Thorax and abdomen grey, sprinkled with ochreous-whitish. Legs dark grey, apex of joints whitish. Fore-wings lanceolate; pale grey, coarsely irrorated with black; an obscure cloudy ochreous-whitish suffusion towards costa at $\frac{3}{4}$; an obscurely-indicated pale spot in disc before middle; cilia whitish-ochreous-grey, with an obscure line of dark scales round apex. Hind-wings and cilia light grey.

The perfect insect appears in January.

I am unacquainted with this species. The above is a copy of the original description.

According to Mr. Morris N. Watt the larva of this species mines the leaves of *Olearia arborescens* and *O. macrodonta* and the imago may be looked for from June till March.*

NEPTICULA PROPALAEAE.

(*Nepticula propalaea*, Meyr., Trans. N.Z. Inst., xxi., 187.)

A single specimen of this species was captured by Mr. Meyrick on Arthur's Pass at an elevation of 3,000 feet above the sea-level.

The expansion of the wings of the female is slightly over $\frac{1}{4}$ inch. Head, palpi, antennae, and thorax whitish-ochreous. Abdomen light grey. Legs whitish-ochreous, anterior pair infuscated. Forewings lanceolate; whitish-ochreous, obscurely irrorated with brownish; a dark fuscous dot on fold at $\frac{1}{4}$, a second in disc before middle, and a third immediately before apex; cilia whitish-ochreous. Hind-wings light grey; cilia whitish-ochreous-grey.

The perfect insect appears in January.

I am unacquainted with this species. The above is a copy of the original description.

NEPTICULA CYPRACMA.

(*Nepticula cypracma*, Meyr., Trans. N.Z. Inst., xlviii., 419.)

(Plate XXXIV., fig. 4 ♂.)

This very distinct little species has occurred in the neighbourhood of Wellington but is apparently rarely met with.

The expansion of the wings is about five-sixteenths of an inch. The head is very small and the antennae less than half the length of the fore-wings. The fore-wings are *very pale shining whitish-ochreous irregularly sprinkled with large blackish scales; there is a metallic coppery-red spot at the apex; the cilia are dark grey and contain several scattered large black scales. The hind-wings are very narrow, pale whitish-grey with long dark grey cilia.*

The perfect insect appears in November. This species seems to imitate the brown and white fluffy seeds of its foodplant (*Brachyglottis repanda*) and the insect's time of appearance synchronizes with that of the seeds.

NEPTICULA PERISSOPA.

(*Nepticula perissopa*, Meyr., Trans. N.Z. Inst., li., 354.)

This species has occurred on Mount Egmont at an altitude of about 3,000 feet above the sea-level.

The expansion of the wings is about $\frac{1}{4}$ inch. Head and eyecaps whitish-ochreous, centre of crown dark grey or blackish. Thorax dark violet-fuscous. Abdomen grey. Fore-wings broad-lanceolate; pale greyish-ochreous, more or less suffused (especially in ♂) with violet-grey, and coarsely and irregularly strewn with dark-fuscous scales, especially towards apex, where in ♀ they form a suffused dark blotch occupying $\frac{1}{4}$ of wing; an elongate dark fuscous spot on fold at $\frac{1}{4}$; an elongate blackish spot in disc beyond middle, in ♀ surrounded by a nearly clear space; cilia pale greyish-ochreous, basal $\frac{2}{3}$ coarsely irrorated with blackish round apex and upper part of termen. Hind-wings grey; cilia light ochreous-grey.

The above is a copy of the original description.

The perfect insect appears in February. In view of the scanty material available I am doubtful if this species is actually distinct from *N. cypracma*. The deep coppery-bronze apical spot, characteristic of that species, seems to vary considerably in intensity in the few specimens I have had the opportunity of examining and may in some instances be absent altogether.

According to Mr. Morris N. Watt the larva of this species mines the leaves of *Brachyglottis repanda*.*

NEPTICULA LUCIDA.

(*Nepticula lucida*, Philp. Trans. N.Z. Inst., li., 225.)

(Plate XLVII., fig. 20 ♀.)

This very beautiful and distinctly-marked little species was discovered by Mr. Clarke at Waitati near Dunedin.

The expansion of the wings is three-sixteenths of an inch. *The head is bright ochreous. The fore-wings have the whole of the basal area to beyond the middle dark greyish-brown; a broad wavy snow white transverse band follows this; the terminal area is jet black; the cilia are blackish-grey with a conspicuous ring of large black scales around the apex and termen. The hind-wings and cilia are blackish-grey.*

*Trans. N.Z. Inst., liii., 200, and lv., 686.

*Trans. N.Z. Inst., liii., 207.

According to Mr. Morris N. Watt the larva of this species mines the leaves of the silver southern beech (*Nothofagus Menziesii*.)*

The perfect insect appears from September till December and frequents beech forests.

Described and figured from a specimen kindly given to me by Mr. Clarke.

NEPTICULA FULVA.

(*Nepticula fulva*, Watt., Trans. N.Z. Inst., lii., 215.)
(Plate LI., fig. 29 ♀.)

This species was discovered by Mr. Morris N. Watt at Dunedin. It also occurs at Nelson, Governor's Bay and Mount Ruapehu.

The expansion of the wings is about $\frac{1}{4}$ inch. The fore-wings are very pale brownish-ochreous with a few scattered brownish-black scales; there are three elongate longitudinal black marks in the disc, the first near the base, the second at about $\frac{1}{3}$ and the third at about $\frac{2}{3}$; the cilia are blackish-grey. The hind-wings are pale brownish-ochreous with blackish-grey cilia.

The larva mines the leaves of various species of *Olearia*.†

The perfect insect appears from November till March.

Described and figured from a specimen, bred from a pupa kindly given to me by Mr. Watt.

NEPTICULA ERICHTITUS.

(*Nepticula erichtitus*, Watt., Trans. N.Z. Inst., lv., 686.)
(Plate LI., fig. 28 ♀.)

This species has occurred at Wellington and Dunedin.

The expansion of the wings is slightly over three-sixteenths of an inch. The fore-wings are pale greyish-ochreous sprinkled with large black scales; these are arranged in three irregular transverse bands, the first near the base, the second about the middle and the third on the terminal area; the costal and apical cilia are ochreous, the rest blackish-grey. The hind-wings are greyish-ochreous, the cilia blackish-grey.

According to Mr. Morris N. Watt the larva mines the leaves of *Erechtites arguta*.‡

The perfect insect appears from December till March.

Described and figured from specimens reared from pupae kindly supplied by Mr. Watt.

NEPTICULA PROGAMA.

(*Nepticula progama*, Meyr., Trans. N.Z. Inst., lv., 662.)
(Plate LI., fig. 30 ♂.)

This species has occurred on Bold Peak, at the head of Lake Wakatipu, at an elevation of about 4,000 feet above the sea-level.

The expansion of the wings is $\frac{1}{4}$ inch. The fore-wings are white sprinkled with pale grey scales, densest on basal third; there is a large patch of black scales on the costa beyond the middle touching a similar patch on the dorsum; another larger patch is situated on the apical area. The hind-wings are pale grey. The top of the head is clothed with pale ochreous scales. The thorax and abdomen are grey, heavily sprinkled with blackish-grey scales.

The perfect insect appears in January.

NEPTICULA PROGONOPIS.

(*Nepticula progonopis*, Meyr., Trans. N.Z. Inst., liii., 336.)
(Plate XLVII., fig. 10 ♂.)

This very distinct species was discovered on the main spur of Mount Arthur, at the bush line, about 4000 feet above the sea-level.

The expansion of the wings is about $\frac{1}{4}$ inch. The fore-wings are elliptical dull bronzy, very heavily covered with large purple and blackish scales very dense on the basal area and in the disc. The hind-wings are grey with purplish reflections. The cilia of all the wings are blackish-bronze. The head is covered with brilliant orange-red hairs; the thorax is purplish-black and the abdomen black.

The perfect insect appears in January.

NEPTICULA ORIASTRA.

(*Nepticula oriastra*, Meyr., Trans. N.Z. Inst., xlix., 247.)
(Plate XL., fig. 6 ♂, 20 ♀.)

This minute, but very striking insect was discovered by Stella Hudson, on a scree, on the eastern side of the Otira River, at an altitude of about 4,000 feet above the sea-level. It has also been taken by Mr. Philpott on the Hunter Mountains at an elevation of 3,000 feet.

The expansion of the wings is about three-sixteenths of an inch. The fore-wings of the male are cream-coloured with three elongate black spots; the first at $\frac{1}{3}$, the second near the middle and the third, which is considerably larger, at the apex. In the female either one or both of the discal spots are absent or very minute but there is a large black apical patch which is very conspicuous. The hind-wings of both sexes are pale greyish-white.

The perfect insect appears in January and rests on the underside of the leaves of *Celmisia*, where it is very hard to see. Like most members of the genus it runs and takes short flights with extreme rapidity.

*Trans. N.Z. Inst., lv., 675. †Trans. N.Z. Inst., liii., 216.

‡Trans. N.Z. Inst., liii., 213.

CHAPTER XVIII.

THE HEPIALIDAE.

The family *Hepialidae** may be readily distinguished by the following characters:—

The head is rough; the antennae very short; the ocelli absent, the proboscis and maxillary palpi obsolete and the tibiae without spurs. The fore-wings have an oblique, membranous dorsal process (jugum) near the base; all the main veins and costa are connected by bars near the base; vein 1b is furcate, forked parting vein strong. The hind-wings have no frenulum and their venation is essentially the same as the fore-wings.

(Plate B., figs. 22-24 and 28-30).

Of an undoubtedly primitive type, this family is very well represented in New Zealand by twenty species, most of which are large and conspicuous insects. In striking contrast we find in the British Islands only five native species of *Hepialidae* which, individually, compared with the New Zealand forms, are puny and inconspicuous, and constitute a very unimportant element in the fauna. The same relation holds good in respect of the European Continent where only nine species occur, and in the whole of the great Palaearctic region a total of only twenty-two species of *Hepialidae* are found. From their strictly nocturnal habits, and inability to feed when in their final condition, these insects are difficult to collect, and it is therefore almost certain that further species remain to be discovered, especially in the more unexplored districts. Whilst the male insects are most susceptible to the attraction of lamps, the females are rarely thus ensnared, and the correct allocation of the sexes, even in many of the commonest species, has proved a matter of considerable difficulty. There is in fact little doubt, that much valuable work in this family remains to be overtaken by the energy and enterprise of future naturalists.

There are two genera represented in New Zealand—

1. HEPIALUS.
2. PORINA.

Genus 1.—HEPIALUS, Fab.

Antennae $\frac{1}{2}$ to $\frac{3}{4}$, in male lamellate or simple. Palpi short, drooping, hairy. Posterior tibiae usually densely rough-haired, in male sometimes with long projecting tuft above. Fore-wings with vein 7 from angle, 8 remote, 9 and 10 stalked. Hind-wings as fore-wings, 8 seldom connate or stalked with 7. (Plate B., figs. 22 and 23 venation of *Hepialus virescens*, 24 head of ditto.)

A genus of universal distribution, but not very numerous in species. Ovary spheroidal, smooth. Larva elongate,

active. Pupa with segmental whorls of spines, enabling it to move actively before emergence.

Represented by one species—*Hepialus virescens*, the largest moth we have in New Zealand.

This insect, together with several allied Australian species, is often placed in a special genus called *Charagia*. As, however, its essential structure is identical with that assigned to the genus *Hepialus*, there appear to be no adequate grounds for its exclusion from that genus.

HEPIALUS VIRESCENS.

(*Hepialus virescens*, Dbld., Dieff. New Zeal., ii. 234; White, Taylor New Zeal., pl. i. 6. *Hepialus rubroviridans*, White, l.c., pl. i. 1. *Charagia virescens*, Walk., Bomb., 1569; Scott, Trans. Ent. Soc. N. S. Wales, ii. 28. *C. fischeri*, Feld., pl. lxxx. 1. *C. hectori*, Butl., Proc. Zool. Soc. Lond., 1877, 380. *Hepialus virescens*, Meyr., Trans. N.Z. Inst., xxii., 211.)

(Plate XLII., fig. 13 ♂, 14 ♀; Plate XLIII., fig. 13 ♂, 14 ♀ varieties.)

This very large and conspicuous insect appears to be generally distributed throughout the North Island.

The expansion of the wings of the male is 4 inches; of the female sometimes almost 6 inches. The fore-wings of the male are bright green, with a series of paler ring-shaped markings between the veins; an irregular row of white spots crosses the wing near the middle, and a small white spot is situated on the costa at the base. The hind-wings are very pale yellowish-brown near the body, becoming pure white in the middle, and pale green on the termen. The head and thorax are green, the abdomen is white, tinged with green at the apex. The female has all the wings of a relatively more attenuated shape; the fore-wings are green, mottled with black; the hind-wings are pale reddish-brown, shaded with green near the termen; the abdomen is also reddish-brown, becoming green at the extremity.

This species is very variable in both sexes. In the male the green ground colour varies considerably, sometimes inclining to bluish-green, more frequently towards yellowish-green, specimens of every intermediate shade and intensity of colouring being met with. The white spots on the fore-wings vary considerably in size, and occasionally there are several additional spots near the body. Sometimes these spots are almost absent and very rarely replaced by a series of elongate blackish marks. An extremely rare and beautiful variety occurs in which the whole of the fore-wings are covered with large white spots. (See Plate XLIII., fig. 13.)* In the female the black markings on the fore-wings are sometimes much more

*For a detailed account of the wing-coupling apparatus in this family, see article by Mr. Philpott in the Transactions of the Entomological Society of London 1925, pp. 331-340 and of the venation pp. 531-535. An article on the male genitalia, with special reference to the New Zealand species, appears in the same Transactions for 1927, pp. 35-41.

*This is the variety *albo-extremus* of Quail. See Trans. N.Z. Inst., xxxv., 252.

extensive than the green ground colour and in this variety (Plate XLIII., fig. 14) dull white patches are often present. Sometimes both sexes have the green ground colour replaced by pale orange-brown and as this difference has been noticed in many fresh specimens it is not the result of fading. The dark coloured variety of the female here figured was described by Butler as a distinct species under the name of *Charagia hectori*.

The transformations of this insect are very interesting. The female lays about two thousand small, round, yellowish eggs, which she seems to deposit quite indiscriminately. The young larvae consequently have to find their way along the ground to the stems of their food-plant, a large percentage no doubt perishing before they succeed in doing so, and it seems likely that the great fecundity of the female has arisen in order to provide against a heavy mortality, during the earliest period of the insect's life. The eggs of *H. virescens* become black a few hours after they are laid, and the same peculiarity is observable in the eggs of many species belonging to the closely allied genus *Porina*. The foodplants of this insect are very numerous; the following are a few of them:—Wineberry or New Zealand Currant (*Aristotelia racemosa*), *Carpodetus serratus* and *Hoheria populnea*, apparently the favourites; puriri (*Vitex lucens*); *mangaio*, (*Lilaea calicaris*); manuka (*Leptospermum ericoides*); kiki (*Astelia Solandri*); black maire (*Olea Cunninghamii*); titoki (*Alectryon excelsum*); ngaio (*Myoporum laetum*); kamahi (*Weinmannia racemosa*); beech (*Nothofagus*); *Leucopogon fasciculatus*, and *Griselinia lucida*. In cultivated places willows, silver beeches, oaks and apple trees have been found pierced with the burrows of this insect. The larva tunnels the stems of these trees, feeding entirely on the wood, which it bites off with its strong mandibles.

For the most part it inhabits the main stem of the tree, its gallery always having an outlet, which is covered with a curtain of silk and refuse spun exactly level with the surrounding bark, and very inconspicuous. These burrows usually run towards the ground, and are mostly two or three inches from the surface of the trunk. In some instances the larvae inhabit branches, in which case, if they are small, the tunnels are made near the centre. Later on in its life, but long before its transformation into the pupa, the caterpillar of this insect constructs a far more complicated burrow than the above. It consists of a spacious, irregular, but shallow cavity, just under the bark, having a very large opening to the air, which is entirely covered with a thin silken curtain, containing numerous fragments of wood, and closely resembling, in general appearance, an ordinary patch on the bark. Three large tunnels open into this shallow cavity: one in the centre, which runs into the middle of the stem, and one on each side, which run right and left just under the bark. These lateral tunnels are usually very short, but sometimes they extend half-way round the tree, and occasionally even join one another on the opposite side. Distinct lateral burrows

are, however, not found in the stems of *Carpodetus serratus*. The central tunnel has a slightly upward direction which effectually prevents it from becoming flooded in wet weather; in smaller trees it often reaches as far as the middle of the trunk, where, in the case of mature larvae, it appears to suddenly terminate. This, however, is not the case, for, if the gallery floor be carefully examined near its apparent termination, a round lid will be found, compactly constructed of very hard, smooth silk, and corresponding with the surrounding portion of the tunnel so exactly that it almost escapes detection. When this lid is lifted a long, perpendicular shaft is disclosed, which runs down the middle of the tree to a depth of about 6 inches, and is about $\frac{1}{2}$ inch in diameter. The upper end of this shaft is lined with silk, which forms a framework on which the lid rests when closed. The lid itself is of a larger size than the orifice which it covers, and is more or less adherent to the silken framework, which makes it very difficult, if not impossible, to force it open from the exterior, especially as it always fits down very closely as long as the insect remains in its burrow. The object of this contrivance is, no doubt, to prevent the ingress of enemies, large numbers of spiders, slugs, woodlice, and various orthoptera being frequently found in both central and lateral tunnels, but they are quite unable to pass the lid. The galleries of individual larvae are all wonderfully alike, the only differences observable being in the length of the perpendicular shaft, and in the length and direction of the horizontal burrow, which is sometimes curved. These variations are usually caused by the presence of other tunnels in the tree, which the larva appears to carefully avoid; at least I have very seldom known an instance where a larva has allowed its tunnel to communicate with another one, whether inhabited or otherwise, and this precaution is necessary for the insect's safety. It is noticeable that the individuals inhabiting one tree are very often of the same age.

A specimen of this larva, attacked by the *Sphaeria* fungus, whilst in its burrow in the tree, was once shown to me by the late Mr. N. J. Tone. This is the only authenticated instance of the conversion of the larva of the present species into a "vegetable caterpillar" although, prior to the discovery of its life history, the older naturalists imagined that all the vegetable caterpillars found in New Zealand belonged to *Hepialus virescens*. It is now, of course, well known that they are referable to the subterranean larvae belonging to the closely allied genus *Porina*.

The caterpillar, when full grown, measures from $2\frac{1}{2}$ to 3 inches in length. It is tolerably uniform in thickness, and of a dull yellow colour. The head is large, dark brown, very irregularly striated, and covered with a few short bristles. The second segment is hard and shining with the back and sides ruddy-brown. Its spiracle, which is very large, is situated near the posterior margin, and a little above it there is a dull black spot, filling a slight concavity about the same size as the spiracle itself. Each remaining segment has on its dorsal surface two horny plates, and two similar plates are situated on each side immediately below the spiracle. The body of the larva is thinly

covered with yellow and black bristles. In many specimens the ventral surface and connecting membrane between the horny plates is pale purple.

The precise duration of the larval stage in *Hepialus virescens* has not yet been determined. It is certainly longer than three years, and probably extends to at least five years, or even more. This is clearly demonstrated by observations on marked trees over a lengthy period.

The last act performed by the caterpillar, prior to undergoing its transformation, is the construction of the above-described silken lid at the top of its vertical burrow. This done, the insect retreats to the bottom, its posterior segment resting on the termination of the gallery. In the course of a few days the skin is cast off and worked downwards to the bottom of the burrow, underneath the last segment of the pupa. The pupa state appears to be generally assumed about the beginning of August and lasts about three months.

This pupa varies from 2 to 2½ inches in length. It is elongate cylindrical and pale ochreous in colour, with the articulations reddish-brown. The head and dorsal portion of the thorax are dark brown and much harder than the rest of the body. On the dorsal surface of the abdomen there are twelve horny ridges armed with minute hooklets, the ridges below each articulation being much stouter than those above. On the ventral surface there are only five such ridges, two being situated on the penultimate segment, and one on each of the three preceding segments.

As development progresses in the pupa it becomes darker in colour, especially on the wing-cases, where, in some female specimens, the future black markings of the moth are quite discernible as long as two months before emergence. Other specimens remain pale in colour until within a fortnight or three weeks of the appearance of the imago, when the green colouring of the wings suddenly becomes visible through their semi-transparent envelopes.

When about to emerge the pupa works its way up the vertical tunnel by means of the above-mentioned hooklets, forces open the lid, and wriggles along the horizontal burrow until it reaches the air. Its anterior portions then break open and the moth crawls out and expands its wings in the ordinary way, resting on the trunk of the tree, until they are of sufficient strength and hardness for flight.

The perfect insect appears early in September, and continues until the middle or end of November. Although it must be common, it is rarely seen; specimens are consequently best obtained in the pupa state and reared in captivity. The easiest way to find the pupa is to pass a straw or thin flexible stick, into the horizontal burrow, and move it about until it touches the lid. The collector is at once apprised of this circumstance by a distinct hollow sound, produced by the straw when it comes in contact with the lid, which acts like a miniature drum. If no such sound is heard after moving the straw into every possible position, it may be assumed either that the insect has left the burrow, or that it is inhabited by a larva. When, however, a pupa is actually discovered, a section of the tree-trunk should be cut out, extending from about

two inches above the horizontal burrow to about one foot below it, and the log, thus obtained, taken home. Should a number of pupae be found in one tree the whole trunk may then be taken, if practicable, and kept in a well-lighted room or a conservatory, until the enclosed insects emerge. The specimens usually come out of the pupa at about five or six o'clock in the evening, and if intended for the cabinet should be killed before dark, as they very soon injure themselves when flying.

The best time of year to obtain the pupa of this insect is during September and the first fortnight in October, as most of the specimens are then in that condition. If sections are cut out of the tree too long before the moths emerge, the contained insect may fail to come out, owing to the shrinkage of the wood. On this account it is advisable to keep the logs damp. Apart from the indications above described, burrows containing larvae may often be known by the fresh pellets of excrement which are present near the opening. The vacated burrows frequently have the remains of the old pupa shell at the entrance, and generally look gnarled and weather-worn. These indications are useful as guides to the collector before exploring the burrow with a straw in the manner above described.

This insect is much attracted by light, and in consequence often enters shop-windows and houses. In fact nearly all the *captured* specimens are so taken, the moth being rarely found in its native forests. This is no doubt largely due to its very perfect protective colouring which, notwithstanding its large size, causes it to be almost invisible, when resting on the branch of a tree. On several occasions I have discovered specimens at rest in the forest, and on leaving them have always had considerable difficulty in again finding them.

The large expansible tuft of long reddish-brown hairs on the tibia of the hind-leg of both sexes is probably a scent organ, but I have not been able to detect any definite perfume by stirring the tuft, even in freshly-killed specimens.

This species is not exempt from the attacks of insectivorous birds as we may occasionally see its large green wings lying on the ground, where they are very conspicuous.

Genus 2.—*PORINA*, Walk.

Antennae one-quarter-two-fifths, in male bi-pectinated, or more or less shortly bi-dentate. Palpi moderate, porrected, basal joint rough-haired, second joint rough-haired or almost smooth, terminal joint smooth, sometimes subclavate. Posterior tibiae densely rough-haired. Fore-wings with vein 7 from angle of cell, 8 and 9 out of 10, rising from upper margin much before angle. Hind-wings as in fore-wings. (Plate B, figs. 28 and 29 neuration of *Porina signata*; fig. 30 head of ditto.)

The nineteen New Zealand species comprised in this very interesting, but difficult genus, are nearly all large and richly-coloured insects, and many of them must be ranked amongst the most handsome of our native Lepidoptera. It is probable that the larvae of most, if not all the species, are subject to the ravages of the *Sphaeria* fungus,

(*Cordiceps robertsii*) which ultimately converts them into "vegetable caterpillars," the true nature of which has often aroused considerable popular interest and misapprehension. The fungus usually attacks the larva in the head or back of the neck, between the head and the second segment, killing the insect in its subterranean habitat and subsequently growing upwards, through the soil, to a height of four or five inches. Fruetification takes place near the top of the stem. The presence of the fungus converts the entire larva into a hard, pith-like substance and thus permanently preserves it.

The fine ichneumon-fly, *Proboloides buchanani*, which we sometimes observe abroad in winter, and the females of which are often found hibernating in crevices under the bark of rimu trees (*Dacrydium cupressinum*), is parasitic in the larva of several species of this genus.

Four species of *Porina* are confined to the North Island; eleven to the South Island, and four occur in both islands.

PORINA SENEX.

(*Porina senex*, Huds., Trans. N.Z. Inst., xl, 107; *Porina*

annulata, Hamilton, Trans. N.Z. Inst., xli, 48.)

(Plate XLIII., fig. 1 ♂; Plate XLIX., fig. 20 ♀.)

This very interesting species was discovered by Mr. J. H. Lewis on the Old Man Range, Central Otago, at an elevation of about 4,000 feet. It has also occurred in the Wakatipu region.

The expansion of the wings of the male is two inches, of the female 1½ inches. The fore-wings of the male are rather elongate with the costa strongly arched before the apex; rich brown, paler towards the base and dorsum; there are very numerous conspicuous white and pale yellow spots between the veins consisting of several faint irregular white markings near the base; a condensed oblique series of white and yellow markings from the apex to the middle of the dorsum and a sub-terminal series of yellow bars; the costal markings are all white and very small. The hind-wings are pale warm brown and semi-transparent with a few whitish marks between the veins near the apex. The head and body are clothed with a mixture of dark brown and ochreous hairs. The antennae of the male are rather long, deep reddish-chocolate, and strongly bipectinated throughout. In the female the antennae are moderately bipectinated. The fore-wings are almost black with white markings; there is a fine longitudinal line from the base close to the costal edge ending in a small eye-like mark at 2; two oblong white marks in the disc before middle; a broad white sub-terminal band containing a black dot below apex; two black centred white spots on vein 2 and a curved basal streak below these. The hind-wings are slightly translucent, blackish-grey becoming black at the apex where there are two minute white marks.

The original specimen of this insect, a dwarf male, was bred in February from a pupa found under stones and kindly given to me by Mr. Lewis. A second and very much finer specimen, also a male, is in the Dominion Museum and formed the subject of the figure and description given in this work. It was captured on Mount Aurum near Lake Wakatipu by Mr. Harold Hamilton in November 1907, on a tussocky patch amongst the gentians. A third specimen was taken by Mr. F. S. Oliver, on the hills

behind Glenorchy at the head of Lake Wakatipu, where he subsequently discovered the female.

PORINA AURIMACULATA.

(*Porina aurimaculata*, Philp. Trans. N.Z. Inst., xlii, 121.)

(Plate XLII., fig. 12 ♂.)

This large and extremely handsome insect was discovered by Mr. F. S. Oliver at the Hermitage, near Mount Cook.

The expansion of the wings of the male is 2½ inches. The fore-wings of the male are dark ochreous-brown, slightly paler in the disc; the costa is clouded with brownish-black near the base and there are numerous irregular, white edged, brownish-black spots between the veins, two confluent spots above the dorsum being much larger than the others; there are five or six conspicuous, pale golden-ochreous spots near the middle of the wing, each usually placed in the centre of a brownish-black spot. The hind-wings are rich brown rather sparsely scaled; the cilia of all the wings are dark brown barred with blackish and irregularly tipped with ochreous. The antennae are dull red and strongly bipectinated throughout.

The female is unknown.

The perfect insect appears towards the end of March and evidently inhabits open mountain country about 2,500 feet above the sea-level. It is attracted by light.

Described and figured from the unique specimen kindly lent to me by Mr. Oliver.

PORINA DINODES.

(*Porina dinodes*, Meyr., Trans. N.Z. Inst., xxii, 206.)

(Plate XLII., fig. 6 ♂, 7 ♀; Plate III., fig. 24 larva.)

This large and distinctly-marked species was discovered at Invercargill by Captain Hutton. It has also occurred at Dunedin, Orepuki and Stewart Island.

The expansion of the wings of the male is about 2½ inches; of the female nearly 3 inches. The fore-wings of the male are dark-brown; there is a white mark at the extreme base; several confused white markings enclosing small brown spots beyond this; an oblique series of double crescentic marks from the apex to the dorsum near the base; several similar markings near the costa and a very faint series near the termen; the middle of the wing is almost clear of markings. The hind-wings are brownish-ochreous, darker near the apex. The cilia of all the wings are whitish barred with dark brown. The antennae of the male are heavily bipectinated from base to apex. The female has the fore-wings dull brown with very obscure paler markings between the veins. The hind-wings are dull brown tinged with ochreous. The antennae are stout, with very short thick pectinations on each side.

There is slight variation in the details of the white markings on the fore-wings of the male.

The larva, which was discovered by Mr. Philpott, is subterranean, feeding on the roots of grasses. It inhabits tunnels lined with silk, and driven, in rather an oblique direction, to a depth of from 15 to 20 inches. The length of the full-grown larva is nearly four inches; it is moderately stout, cylindrical, with the segmental divisions very much wrinkled; the head is dark reddish-brown with its surface rugose; the second segment is short, horny, pale reddish-brown; the third segment partly horny and pale reddish-brown in patches; the rest of the body is soft,

bright yellow-ochreous, duller beneath; the legs are small and the prolegs large and stout.

The pupa state is assumed about the middle of August. Although not actually reared there is no doubt that the above described larva belongs to *Porina dinodes*, and that the large vegetable caterpillars found in the extreme south of New Zealand may also be correctly referred to the same species.

The perfect insect appears from January till March, and is attracted by light. It is evidently rare and apparently only one specimen of the female is known. I am much indebted to Mr. Philpott for my specimens and for the opportunity of figuring the female in his collection.

PORINA LEONINA.

(*Porina leonina*, Philp., Trans. N.Z. Inst., lvii., 709.)

A single somewhat damaged specimen of this species was captured by Mr. Philpott on the Mount Arthur Tableland, at an altitude of about 3,600 feet above the sea-level.

It differs from the usual forms of *Porina dinodes* in the following respects: There is a marked reduction in the white markings in the upper portion of the disc; the white marks forming the subterminal series are further apart, and the components straighter, thus leaving a conspicuous oblique subterminal band of brownish-ochreous between them; the general colour of both fore- and hind-wings is warmer in tint than is usual in *P. dinodes*. The cilia of all the wings are pale brown, strongly barred with black.

The perfect insect appears in April.

PORINA MAIRI.

(*Porina mairi*, Buller, Trans. N.Z. Inst. v. 279, pl. xvii.; Meyr., Trans. N.Z. Inst., xxii., 207.)

A single specimen of this fine species was discovered by Sir Walter Buller on the Ruahine Ranges, in the Wellington district, during the summer of 1867.

The expansion of the wings is about 5 inches. "Wings large, broad, front-wings produced, ovate-triangular, pale dirty testaceous; six black spots terminating veins on outer margin, and bounded by a lunated marginal white band; a submarginal series of arrow-headed black spots, and beyond these a series of rounded spots, the first four encircled with white, the rest with pale brown; two broken, black discal lines filled in with brown; a broad irregular band to below centre of wing, beyond cell, and formed of three black lines with brown interspaces; a triangular white spot below cell and a white patch terminating it and traversed by two black crosses; two diverging black bars surrounded with white in centre of cell and a third surrounded with dirty testaceous near base; a large irregular patch of whitish-brown below end of cell, bounded on internal area by three unequally formed patches which together almost form the sides of a large triangle; two small spots near base; hind-wings greyish, becoming browner towards outer margin and crossed by eight interrupted black bars."—(Buller).

I have copied the above from Sir Walter Buller's original paper, and it may be well to point out that his description proceeds from the termen to the base, being the reverse order to that followed in all other descriptions in this work.

The type specimen of this species was unfortunately lost in the wreck of the barque "Assaye" in the year 1890 and no further specimen has since been found. It seems almost incredible that such a large and conspicuous species should have escaped the notice of New Zealand naturalists for 60 years, and on this account one is tempted to conjecture that the type specimen might have been an extraordinary aberration of *Hepialus virescens*.

PORINA ENYSII.

(*Porina enysii*, Butl., Proc. Zool. Soc. Lond., 1877, 381, pl. xlii. 7. *Porina enysii*, Meyr., Trans. N.Z. Inst. xxii., 207.)

(Plate XLI., figs. 4-6 ♂ vars.; 7-10 ♀ vars.;

Plate III., fig. 27 larva.)

This large and richly-coloured insect is apparently confined to the North Island. Although usually rare, it occasionally occurs in considerable numbers within certain favoured spots which it frequents.

The expansion of the wings of the male is slightly over 2½ inches; of the female about 3¼ inches. The fore-wings of the male are dark ochreous-brown, usually more or less marbled with rich chocolate brown, which sometimes almost covers the entire wing; there is no discal stripe in either sex but variable numbers of minute black-edged white dots are placed irregularly on all the veins. The hind-wings are rich pinkish-ochreous. The cilia of all the wings are whitish barred with brown. The female is very variable. Some specimens have the fore-wings uniform pale chocolate brown; others rich orange-brown faintly mottled with blackish; others again have an extensive mottling of white, whilst in some the fore-wings are almost uniform pale ochreous-brown or even yellow. The hind-wings are pinkish-ochreous varying in depth according to the general colour of the fore-wings. A variety occurs in both sexes, having a very broad ochreous band on the fore-wings from the base to the lower half of the termen.

There is a very extensive and beautiful series of specimens of this species in the Dominion Museum at Wellington, collected by the late Mr. Augustus Hamilton in a restricted spot in the Wellington Botanical Gardens. This series includes all the varieties mentioned, as well as numerous intermediate forms, and has been of the greatest assistance in preparing the figures and descriptions given in this work.

The larva, which is subterranean in habit, feeding on the roots of plants in the forest, has 14 distinct segments; the head is small, dark brown; the second segment horny, yellowish-brown; the third has three large, yellow, horny plates; the fourth has three small horny plates and is much wrinkled; the rest of the body is dull yellowish-white, shining and much wrinkled between each segment; the last segment is yellowish-brown; there are a few very short black bristles; the spiracles are black and very conspicuous; no warts are present on the larva.

Although not yet actually reared in captivity, there seems to be little doubt that this larva is correctly referred to the present species.

The perfect insect appears towards the end of December and in January. It frequents rather open forests, and is especially fond of resting on the stems of tree-ferns dur-

ing the day-time where it is extremely inconspicuous, and can only be discovered by very careful searching. It is most probable that many of the larger "vegetable caterpillars," which are dug up in forests, are referable to this insect.

PORINA CHARACTERIFERA.

(*Hepialus characterifer*, Walk., Suppl. 594. *Oxycaenus impletus*, ib. 598. *Porina characterifera*, Meyr., Trans. N.Z. Inst. xxii. 208.)

(Plate XLI., fig. 11 ♂, 12 ♀.)

This very handsome and conspicuous species is principally confined to the North Island, where it has occurred at Auckland, Mount Egmont, Stratford, Kaitoke and Wellington. In the South Island it has been found at Pieton and on the Dun Mountain and Goulard Downs in the Nelson district.

The expansion of the wings of the male is slightly under 3 inches; of the female nearly 3½ inches. The fore-wings are bright brownish-yellow, very densely and finely streaked and mottled with very dark purplish-brown; there is a doubly-curved black mark a little above the middle of the dorsum. The hind-wings are very dark purplish-brown with a terminal series of yellow ring-like markings; the cilia are yellow barred with brown. The female is much paler in colour than the male, with the dark brown mottling of the fore-wings even more elaborate, and forming a pattern of extreme beauty and complexity; there are series of pale terminal and subterminal spots with brown centres which are not evident in the male.

The perfect insect appears in October, November and December. It seems to chiefly frequent beech forests on mountain sides, at elevations between 1,000 and 2,000 feet above the sea-level, but is usually very rare. As a rule it is only taken singly but Mr. Watt informs me that he met with it in some numbers on the lower slopes of Mount Egmont and Mr. Grimmett found it in profusion on the Goulard Downs. The colouring of the fore-wings is highly protective when the insect is resting with closed wings on moss-covered tree-trunks.

PORINA CERVINATA.

(*Ethamnia cervinata*, Walk., Suppl. 595. *Porina vexata*, ib. 597. *Pictus variatoris*, Gn., Ent. Mo. Mag. v. 1. *Porina fuliginosa*, Butl., Cist. Ent. ii. 488. *Porina cervinata*, Meyr., Trans. N.Z. Inst. xxii., 208.)

(Plate XLIII., figs. 5, 6 ♂ varieties; 7 ♀.
Frontispiece fig. 26 egg.)

This very variable species seems to be fairly common and generally distributed throughout the North Island, and is abundant in the Wellington District. In the South Island it occurs as far south as Dunedin and Alexandra, but it is here largely replaced by the very closely allied *P. despecta*, and in the extreme south by *P. jocosca*, and *P. capularis*.

The expansion of the wings of the male ranges from 1½ to 1¾ inches; of the female rarely as much as 2¼ inches. All the wings vary from pale brownish-black to dull yellowish-brown with numerous intermediate forms; the fore-wings have several small blackish-margined white spots near the base; an indefinite

blackish central streak usually containing two or three irregular white spots; there is often a pale wavy transverse line beyond the middle, containing several darker spots and a series of terminal and subterminal spots; the cilia are barred with dark brown.

This species is extremely variable in size, colour and markings. It is stated to be shorter winged than *P. despecta* but is otherwise very similar.

The egg is oval, approaching the hemispherical, yellowish-white when first deposited, but usually becoming jet black shortly afterwards. It is highly polished and destitute of sculpture.

The larva is subterranean in habit, feeding on the roots of grasses during the late summer, autumn and winter. In its habits and general appearance it closely resembles the larva of *P. umbraculata*.

The perfect insect is found early in September and lasts well on into November, being one of the first of the genus to appear in early spring. It is attracted by light, the males very much more freely than the females. This species usually frequents gardens and fields and has probably increased in numbers through the spread of European grasses.

PORINA DESPECTA.

(*Hepialus despectus*, Walk., Suppl. 594. *Porina despecta*, Meyr., Trans. N.Z. Inst. xxii., 209.)

(Plate XLIII., fig. 8 ♂; 9-11 ♀ varieties.)

This species, which very closely resembles *Porina cervinata*, has occurred at Christchurch, the Otira River, Dunedin, and Lake Wakatipu.

The expansion of the wings of the male is slightly over 1½ inches; of the female about 2 inches. It is stated to be distinguished from *P. cervinata* by its longer and narrower wings, smaller body and antennae and absence of distinct markings near the termen. Nearly all the specimens in collections which are relegated to this species are females, and this may perhaps indicate that the male is often identified as *P. cervinata*. In any case the males in the *Hepialidae* are generally more often taken than the females.

In its general habits and life-history this species is probably identical with *P. cervinata*.

The perfect insect appears from November till February, and is usually taken at light.

PORINA MIMICA.

(*Porina mimica*, Philp., Trans. N.Z. Inst., liv., 153.)

(Plate XLIV., fig. 15 ♂.)

This rather obscure species was discovered by Mr. Philpott at Invercargill.

The expansion of the wings of the male is 1½ inches. It may be distinguished from any of the numerous varieties of *Porina cervinata* and *P. despecta* by its much slenderer build and from *P. jocosca* by its smaller size and absence of the bright orange-brown colouring and distinct wavy paler subterminal band on the fore-wings, which are characteristic of that species.

The perfect insect appears in October.

Described and figured from a specimen kindly given to me by Mr. Philpott.

PORINA JOCOSA.

(*Porina jocosa*, Meyr., Trans. N.Z. Inst., xlv., 124.)

(Plate XLII., fig. 1 ♂; 2 ♀.)

This bright-looking distinctly-marked species was discovered by Mr. Philpott at West Plains near Invercargill.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches, of the female sometimes almost 2 inches. The fore-wings of the male are *bright ochreous-brown*; there are several indistinct blackish-edged white spots irregularly placed near the base; two clear white discal spots at about $\frac{1}{4}$ and before middle; several minute spots above and below these; an *irregular whitish transverse shading from the costa before the apex to the dorsum near the middle containing several small blackish-edged white spots*; a subterminal series of pale centred dusky spots and a terminal series of brown dots. The hind-wings are dull ochreous-brown. The cilia of all the wings are pale ochreous *very strongly barred with dark brown*. In the female the fore-wings are dull blackish-brown or blackish-grey very thinly scaled; there are two variable cream-coloured discal spots at about $\frac{1}{4}$ and $\frac{3}{4}$; a *very wide irregular, cloudy, transverse white band from the costa just before the apex to the middle of the dorsum*; a subterminal series of dusky marks on the veins, often absent and a terminal series of whitish-edged dusky spots between the veins. The hind-wings are grey and semi-transparent.

Both sexes vary considerably in the extent of the cloudy white transverse shading and in the number and extent of the dusky spots, but the markings are always clearer and more numerous than in most of the allied species.

The perfect insect appears in October and November, and frequents forest country. It is attracted by light.

PORINA COPULARIS.

(*Porina copularis*, Meyr., Trans. N.Z. Inst., xlv., 123.)

(Plate XLII., fig. 8 ♂; 9 ♀.)

This very faintly-marked species was discovered by Mr. Philpott at West Plains, near Invercargill.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches, of the female from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches. The fore-wings of the male are rather narrow with the apex slightly produced and the termen obliquely rounded; *pale dull reddish-ochreous more or less tinged with grey between the veins*; the blackish-edged white discal spots, which are variable, consist of a very minute mark near the base, two small spots near the middle, the first oval, the second wedge-shaped; a minute dot just beyond this and another minute dot in the disc at about $\frac{1}{4}$; there is usually a very indistinct, oblique transverse pale shading. The hind-wings are paler than the fore-wings and without markings. The cilia of all the wings are ochreous, indistinctly barred with reddish-ochreous.

The female has the wings much narrower; *strongly clouded with grey except on the costa*; there is a cloudy dark grey discal streak containing one very narrow elongate white spot almost in the centre of the wing. Except on the costa the hind-wings are clouded with grey. The cilia of all the wings are barred with greyish-ochreous. In both sexes the wings are sparsely covered with scales.

Appears to vary somewhat in size and in the depth and extent of the cloudy grey colouring.

The perfect insect appears in December and January, and is found in forest districts. It is attracted by light.

PORINA UMBRACULATA.

(*Pictus umbraculatus*, Gn., Ent. Mo. Mag. v. 1. *Porina umbraculata*, Meyr., Trans. N.Z. Inst. xxii. 209.)

(Plate XLI., figs. 1, 3 ♂ varieties; 2 ♀; Plate III., fig. 26 larva.)

This species is common and generally distributed throughout the country.

The expansion of the wings of the male is nearly 2 inches; of the female about $2\frac{1}{2}$ inches. All the wings of the male are pale brownish-ochreous, rarely greyish-brown, intermediate forms being often met with; *in the centre there is a broad longitudinal blackish streak containing a conspicuous straight white stripe, occasionally broken into two or three very elongate spots*; there are often several black dots along the termen and several blackish subterminal dots. The hind-wings are less densely scaled than the fore-wings and, in living specimens, usually tinged with pink. In the female all the wings are pale ochreous-brown and the central streak of the fore-wings is narrower and less distinct than in the male.

There is, as already indicated, considerable variation in the depth of the ground colour and in the number of the black dots. A broad cloudy subterminal band is often present on the fore-wings, in both sexes.

The larva, which feeds on the roots of grasses, is subterranean in habit, living throughout the autumn and winter in burrows at a depth of from three to five inches below the surface of the ground.

Its length when full-grown is about $2\frac{1}{2}$ inches. It is of almost uniform thickness and somewhat flattened. The head is large, very hard and horny, slightly flattened, dark brownish-black and highly polished; the second segment is small, dark reddish-brown and horny throughout; the third segment has two large horny plates, the fourth much smaller plates; the rest of the body is greyish-black much paler on the sides and ventral surface, but somewhat variable in this respect; the segmental divisions are much furrowed; there is a yellowish white lateral ridge and the last segment is brownish-ochreous; there are two rather large warts on segments 5 to 12 inclusive and numerous warts on segment 13; the whole larva is clothed with rather short black bristles.

The perfect insect appears from October till January, and is generally captured at light.

PORINA SIGNATA.

(*Elthamma signata*, Walk., Bomb. 1563. *Porina novae-zealandiae*, lb. 1573. *Porina signata*, Meyr., Trans. N.Z. Inst. xxii. 210.)

(Plate XLIII., figs. 2, 3 ♂ vars.; 4 ♀. Plate III., fig. 28 larva.)

Apparently abundant in the North Island where it has been taken plentifully at Thames, Ohakune, Napier, Palmerston North and Wellington, but has not yet been recorded from the South Island.

The expansion of the wings of the male is from 2 to $2\frac{1}{2}$ inches; of the female sometimes as much as $3\frac{1}{4}$ inches. The fore-wings of the male are brownish-ochreous, usually considerably darker towards the base and costa and paler below the disc and on the termen; *there is a shaded central streak containing several elongate, white spots which form an irregular broken stripe in the middle of the wing*; there are also many irregular markings with dull white centres, chiefly situated near the veins and often arranged in two or three rows parallel to the termen. The hind-wings are ochreous, very strongly tinged

with pink when the insect is alive. In the female all the wings are rather sparsely covered with scales; the fore-wings are dull brown, darker towards the base and costa; the white discal markings are very narrow, and most of the other markings indistinct or absent. The hind-wings are thinly clothed with ochreous brown hairs, denser towards the base.

There is considerable variation in the male both in respect of the depth of the ground colour and dark shading on the fore-wings; also in regard to the number and intensity of the pale-centred markings near the termen. The female varies in size and in the depth of the ground-colour of both fore- and hind-wings.

The larva, which is subterranean in its habits, feeds on the roots of tree-ferns and other plants. It probably lives for more than a year before reaching maturity. When full-grown it is slightly over $2\frac{3}{4}$ inches in length, cylindrical and of almost uniform thickness; the head is rough, horny and very dark brown; the second segment bright brown, also horny; the third segment ochreous with three large, pale brown, chitinous plates; the rest of the body is dull ochreous, much wrinkled between the segments; there are two rows of obscure warts on the back, each emitting a short bristle; the anal segment is dull brownish-black. This larva is frequently attacked by the *Sphaeria* fungus and converted by it into a "vegetable caterpillar," and many of the specimens which are found unquestionably belong to this species.

The perfect insect appears from December till March. Whilst the males are often taken in great numbers at lamps the female is very seldom found and, in view of the abundance of the male, her apparent rarity must be ascribed to extremely secretive habits. The intense vivacity of the male is no doubt an essential attribute which enables him to search for, and discover the female in her seclusion.

PORINA FUSCA.

(*Porina fusca*, Philp., Trans. N.Z. Inst., xlvii., 121.)

(Plate XLII., fig. 11 ♂; fig. 10 variety.)

This rather small, dark-looking species was discovered by Mr. Oliver on Advance Peak, Macetown. It has also occurred on Mount Grey, North Canterbury, on the Humboldt Range at the head of Lake Wakatipu at an altitude of about 3,600 feet above the sea-level and on Ben Lomond.

The expansion of the wings of the male is about $1\frac{1}{2}$ inches. The antennae of the male are rather long and strongly toothed. The fore-wings have the costa almost straight and the termen rounded, but very slightly oblique; *dull ochreous-brown with numerous blackish-grey markings*; there are usually three white discal spots above the middle in a cloudy blackish streak; a conspicuous black streak near the dorsum, extending from the base to about $\frac{1}{2}$ and containing a large irregular curved white mark; there are several irregular grey marks in the disc, a wavy subterminal line, and a terminal series of pale-edged blackish spots. The hind-wings are blackish-grey and more densely scaled than usual. The female is stated to have light brown fore-wings, with the markings almost obsolete and pale brownish-grey hind-wings.

There is considerable variation in the extent of the ochreous-brown and darker markings, but the double series

of white discal spots is a good character. Some specimens are very small in size.

The perfect insect appears in December. It evidently frequents open scrubby country, at about 4,000 feet above the sea-level, and flies freely just before dark.

PORINA DESCENDENS.

(*Porina descendens*, Huds., Ent. Mo. Mag., lix., 180.)

(Plate LI., fig. 19 ♂.)

Two specimens of this interesting species have been taken on Arthur's Pass at an elevation of about 3,000 feet above the sea-level.

The expansion of the wings of the male is $1\frac{1}{2}$ inches; of the female $1\frac{1}{4}$ inches. The fore-wings of the male are rather broad; *pale whitish-ochreous with many irregular brown markings*; the costa is narrowly edged with dull reddish-brown, with a well-defined subapical patch; a cloudy reddish-brown subcostal marking extends from near the base to $\frac{2}{3}$; a cloudy much darker brown subterminal band; a series of subterminal spots involved in this; there are traces of an irregular blackish discal streak, having at its outer end a sinuation filled in with white; a very conspicuous downwards-curved black band is situated above dorsum finely edged with white towards disc; inside the subterminal band and below the subapical patch there is a series of faintly-ringed small blackish-brown marks; these are placed on the pale ground colour; there is a terminal series of pale spots each centred with a black dot. The hind-wings are dark brown. All the cilia are brownish-ochreous barred with dark brown. The body is clothed with shaggy reddish-brown hair. The antennae are bright reddish-brown. The female is almost wholly very pale brownish-ochreous. The fore-wings are darker towards the base; the markings, which are similar to those of the male, are very faint and some are obsolete; the oblique subterminal band is absent, but the dark subterminal spots are clearly marked.

This species is evidently allied to *Porina fusca* but the characteristic dorsal streak is much shorter in that species. The antennae are also stouter than in *Porina fusca*.

The perfect insect appears in January.

The male was described and figured from a specimen kindly given to me by Mr. H. Hamilton. The single female was taken by myself some years previously.

PORINA OREAS.

(*Porina oreas*, Huds., Ent. Mo. Mag., lvi., 277.)

(Plate XLIV., fig. 19 ♂; 20 ♀.)

This fine species was discovered by Miss Averil Lysaght on Mount Egmont at an altitude of about 3,000 feet above the sea-level.

The expansion of the wings of the male is $1\frac{1}{2}$ inches, of the female nearly 2 inches. The fore-wings of the male are chocolate-brown tinged with reddish towards the dorsum with a whitish patch in the middle of the basal area; there is a very thick wavy black streak at the base below the middle reaching about $\frac{2}{3}$ the length of the dorsum; this is margined with white towards the disc; seven blackish-edged white spots are situated on the costal area; a small one on the costa at the base, two large ones above the disc before the middle, one each between veins 9 and 10 and 8 and 9 and two between veins 7 and 8; there is a series of subterminal dusky marks between the veins, one or two white-centred, and a cloudy dusky band inside these. In the female the ground colour of the fore-wings is redder with

reddish patches around all the principal markings which are very much smaller and less distinct than in the male. The hind-wings in both sexes are brownish-grey and semi-transparent. The cilia of all the wings are brownish-ochreous irregularly barred with brown.

Apparently closely allied to *Porina fusca*, of which it may ultimately prove to be merely the North Island form. The perfect insect appears in December.

Described and figured from Miss Lysaght's specimens.

PORINA ASCENDENS.

(*Porina ascendens*, Meyr., Trans. N.Z. Inst., lili., 336.)

(Plate XLIX., fig. 21 ♀.)

Four female specimens of this species were taken in January 1889 amongst tussock grass on the Tableland of Mount Arthur at an altitude of 3,600 feet above the sea-level, but so far as I have been able to ascertain, no other specimens have since been taken.

The expansion of the wings is about $1\frac{1}{2}$ inches. The fore-wings have the costa almost straight, arched near the apex and the termen slightly rounded oblique; *pale bronzy-ochreous*; a broad irregular darker brown cloud on the costa narrowest at the base; a brownish spot before the apex; an oblique slightly waved cloudy brown band from the apex to middle of dorsum; *an irregular very fine blackish longitudinal stripe above middle partly outlining two or three irregular whitish marks; a much shorter line below middle clouded with whitish towards costa*; there is a subterminal series of small whitish spots clearly outlined in dark brown and several similar spots towards apex. The hind-wings are pale rosy-grey clouded with ochreous towards the termen.

Although rather obscurely-marked, this species is quite distinct from any other. It was figured on Plate XIII., fig. 18 of my previous book, as a variety of *Porina cervinata*, but this identification is certainly erroneous.

PORINA MINOS.

(*Porina minos*, Huds., Trans. N.Z. Inst., xxxvii., 357; *Porina autumnata*, Huds., Ent. Mo. Mag., lvi., 277).

(Plate XLII., fig. 5 ♂; 3 ♂ variety, 4 ♀; Plate XLIII., fig. 12 ♂ North Island form.)

This very variable species was first discovered by Mr. J. H. Lewis at Ophir, Central Otago. It has since been

taken at Lower Hutt near Wellington, at the Haast Pass, Southern Alps, at Paradise, Lake Wakatipu, and at Ore-puki, Southland.

The expansion of the wings of the male is from $1\frac{1}{2}$ to about $1\frac{3}{4}$ inches; of the female 2 inches. The fore-wings of the male vary from rich chocolate brown (North Island), to yellowish-brown, or dark greyish-brown (South Island and mountain specimens); the markings are clear white and golden-ochreous-brown *but there is no distinct central streak*; a rather elongate spot at the origins of veins 7, 8 and 9; six minute white marks between the same veins towards the termen; a large curved mark at the origins of veins 4, 5 and 6 and three wedge-shaped marks beyond this; there are several curved marks between veins 2, 3 and 4 near origin and a terminal series of white marks between veins 2 to 8 inclusive; below the middle of the wing most of the white markings are broadly edged with golden-ochreous-brown. The hind-wings are pale brown, semi-transparent, with the veins much darker. The cilia of all the wings are dark brown barred with golden-ochreous. The thorax is clothed with dense dark-brown hairs; the abdomen is brownish-ochreous. The antennae are dull ochreous, bidentate, each dentation being about equal to the width of the stalk. *The palpi are longer than in any other species of the genus known to me, especially in the female*; the basal joint is forked (as Mr. Philpott has pointed out to me), the second joint slender, and the terminal joint slightly dilated towards apex. In the female all the wings and cilia are uniform brownish-grey, without markings; the palpi are longer and slenderer than in the male, with the terminal joint conspicuously dilated. The head and thorax are brownish-grey, the abdomen dull ochreous with a conspicuous anal tuft.

Varies greatly in the extent and number of the white markings in the male, which, in some specimens, tend to become smaller and confluent. In such examples many of the white markings may be surrounded, or replaced, by ochreous.

Whilst there is no absolute proof that the forms, here described as male and female, actually belong to the same species, the peculiar palpi, common to both, warrant such an assumption in the meantime.

The perfect insect appears in May, and is attracted by light.

Described and figured from specimens kindly supplied by Messrs. Lewis, Clere, Peter Field, Harold Hodgkinson and R. Dunlop.

CHAPTER XIX.

THE MICROPTERYGIDAE.

The Micropterygidae* are distinguished by the following characters:—

The head is rough; the ocelli are present; the maxillary palpi are long, several-jointed, folded. The fore-wings are furnished with a jugum; vein 1b is furcate sometimes connected by a bar with the dorsum; 1c connected with the cell by a bar near the base; forked parting-vein strong, rising from lower margin of cell near the base, secondary cell well-marked, vein 12 connected with cell by bar near base. Neuration of hind-wings essentially the same as fore-wings; there is no frenulum. (Plate A., figs. 10, 11, 14, 15, 16.)

The most primitive family of *Lepidoptera*, including about 72 known species of which 23 are from New Zealand, but they are probably often overlooked. More forms of this highly interesting and important group probably remain to be discovered in New Zealand, and search is recommended in damp places or margins of brooks in forests at considerable elevations in early spring, before other insects are common. In Europe most of the family occur in very early spring.

It appears most probable that the New Zealand Micropterygidae were originally derived from South America, through the intermediary of the Antarctic lands, and that the species of *Sabatinca* found in Queensland reached that country from New Zealand.

The New Zealand genus *Sabatinca* is the most ancient known. It differs from the European genus *Eriocephala* in still retaining the following ancestral characters, i.e. the trifurcation of vein 1b, the sub-basal bar between the parting vein and upper cell-margin, the additional vein rising out of 11, and a second additional vein rising out of 12 near base. The possession of these structures causes the neuration of *Sabatinca* to be practically identical with that of *Rhyacophila*, a genus of *Trichoptera* (caddis-flies); (Plate A., figs. 12, 13 neuration of *Rhyacophila munda*); the only important difference is that in *Rhyacophila* there is an additional vein rising out of 4 in the fore-wings, but it is interesting to observe that this very vein has disappeared in the hind-wings. Nothing at all approaching this form of neuration is known in any other Order of insects, and it is highly improbable that so complex a type could have originated twice independently; there need be no hesitation therefore, in concluding that the relationship (which is equally indicated in the mouth-parts and other structures) is real. (Meyrick).

Most of the New Zealand species fly in the sunshine, in forest glades, where they are extremely hard to see in the broken lights.

The larvae of the European species are apodal and leaf-miners, except that of *Eriocephala*, which feeds amongst wet moss. At present our knowledge of the life-histories of the New Zealand species is somewhat fragmentary. A larva, discovered by Mr. Philpott, and believed to be that of *Sabatinca barbarica*, is described in the Transactions of the Entomological Society of London pp. 437-453, 1922; also the pupa skin and cocoon of *S. incongruella*. The foodplant of the larvae of both species is believed to be a species of liverwort.

Three genera of *Micropterygidae* are represented in New Zealand.

1. MNESARCHAEA. 2. MICROPARDALIS.
3. SABATINCA.

Genus 1.—MNESARCHAEA, Meyr.

No mandibles. Tongue short. Labial palpi well developed. Maxillary palpi terminating in a porrected brush. Middle tibiae with two apical spurs. (Plate A., figs. 10, 11 neuration of *Mnesarchaea hamadelphe*).

We have five species of this very interesting endemic genus.*

MNESARCHAEA PARACOSMA.

(*Mnesarchaea paracosma*, Meyr., Trans. N.Z. Inst., xviii., 180.)
(Plate XXXIX., fig. 26 ♀.)

This obscurely-marked species has occurred at Nelson, Dunedin and Lake Wakatipu.

The expansion of the wings is considerably under $\frac{1}{2}$ inch. The fore-wings are elliptical, pale golden-ochreous with two whitish transverse bands; the first at $\frac{1}{2}$ strongly oblique almost reaching the tornus, the second at $\frac{1}{2}$ nearly straight; there are a few faint brownish scales on the costa near the base and on the fold; a conspicuous patch of darker scales in the disc before the middle; several irregular elongate patches near the outer edge of the first transverse band and a very dense patch of brownish scales on the apical area; the cilia are golden-ochreous mixed with brownish scales near the apex. The hind-wings are grey with strong golden-purplish reflections; the cilia are brownish-ochreous on the costa and grey on the termen.

The perfect insect appears in December and January. It is found amongst rough herbage, in open country, ascending to elevations of about 2,000 feet above the sea-level.

*An article by Mr. Philpott on the uncus of the Micropterygidae appears in the Transactions of the Entomological Society of London, 1926, pp. 371-376.

*An article, by Mr. Philpott, on the genitalia of the members of this genus appears in the Transactions of the New Zealand Institute, vol. lvii., pp. 710-715.

MNESARCHAEA FUSCA.

(*Mnesarchaea fusca*, Philp., N.Z. Journal of Science and Technology v., 82, 1922).

(Plate L., fig. 2 ♂.)

This species has occurred at Wilton's Bush near Wellington, and on Goulard Downs near Nelson.

The expansion of the wings is almost $\frac{3}{4}$ inch. All the wings are lanceolate. The fore-wings are dull purplish-brown thickly strewn with darker brown scales; the basal area is more or less densely speckled with golden-ochreous scales especially below the fold; there is a rather large patch of golden-ochreous on the costa before the apex and another much smaller patch close to the apex; the cilia are dark purplish-brown; there is broad golden-ochreous bar near the middle of the termen and on the dorsum. The hind-wings are deep brownish-purple with blackish-brown cilia.

The perfect insect appears in February and March. I have taken it, quite plentifully, by sweeping ferns in damp places in Wilton's Bush.

MNESARCHAEA FALLAX.

(*Mnesarchaea fallax*, Philp., Trans. N.Z. Inst., lvii., 709.)

This extremely obscure form was found by Mr. Philpott on the Tableland of Mount Arthur at an elevation of 4,500 feet above the sea-level.

Like *M. fusca* but apparently slightly larger and narrower-winged than that species.

The perfect insect appears early in December.

Described from Mr. Philpott's specimen.

MNESARCHAEA HAMADELPHA.

(*Mnesarchaea hamadelpha*, Meyr., Trans. N.Z. Inst., xx., 91;

Mnesarchaea similis, Philp., ib., lv., 667.)

(Plate XXXIX., fig. 24 ♂.)

This very handsome species has occurred abundantly at Ohakune, Mount Egmont, Tararua Range, Wellington, Nelson and the Buller and Otira Rivers. It is probably common and generally distributed in most wooded districts in the North Island and northern portions of the South Island.

The expansion of the wings is considerably under $\frac{1}{2}$ inch. The fore-wings are cream-coloured clouded with pale golden-brown towards the apex, termen and dorsum; there is a broad, curved, chocolate-brown band from the costa at the base to the disc near the tornus; a small curved brown mark on the dorsum near the base; two white discal dots beyond the middle; a white costal spot before the apex; a series of terminal white spots and scattered brown scales and a black spot at the apex. The hind-wings are brownish-grey with strong purple reflections and a small blackish apical spot.

The perfect insect appears in December and January, usually frequenting forests. It delights to fly in damp sunny openings, but may be found in densely shaded spots as well. On Tabletop, Tararua Range, it is plentiful amongst the tussock grass, at the upper edge of the forest, about 4,000 feet above the sea-level.

MNESARCHAEA LOXOSCIA.

(*Mnesarchaea loxoscia*, Meyr., Trans. N.Z. Inst., xx., 90.)

(Plate XXXIX., fig. 23 ♂.)

Another fine species occurring at Auckland, Raurimu, Ohakune, Kaitoke and Wellington, where it is common in

certain restricted localities. It has also occurred in the Buller Valley and on Mount Arthur in the South Island.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings are cream-coloured clouded with deep bronzy-brown on the apex and termen; there is a very broad triangular patch of deep blackish-brown on the costa extending from the base to beyond the middle; a small triangular brown mark on the dorsum beyond the middle, sometimes touching the costal patch; a series of scattered white scales on the termen. The hind-wings are deep purplish-grey with scattered golden scales on the costa and termen.

Superficially this species somewhat resembles *M. hamadelpha*, but is a much darker-looking insect; the brown markings are also much broader than in that species.

The perfect insect appears from the end of October until the end of December, and frequents damp places in forests. It is, however, fond of flying in sunny openings and when on the wing is very hard to see. It rests standing on all its legs, with the wings closed vertically, forming a very steep roof, and the antennae held erect and divergent.

Genus 2.—MICROPARDALIS, Meyr.

Mandibles developed. No tongue. Labial palpi rudimentary. Maxillary palpi long, folded. Middle tibiae with apical bristles, without spurs. Fore-wings with veins 7 and 8 separate.

An endemic genus containing two species.

MICROPARDALIS DOROZENA.

(*Palaeomicra dorozena*, Meyr., Trans. N.Z. Inst., xx., 92; *Micropardalis dorozena*, ib. xlv., 124; Gen. Ins. cxxii., f.2.)

(Plate XXXIX., fig. 27 ♀.)

This very beautiful and interesting species has occurred on the Waitakere Ranges near Auckland, at Gisborne, Tarawera, Waimarino, Silverstream, Gollan's Valley and Wainuiomata near Wellington. It is not, however, by any means a common insect.

The expansion of the wings is five-sixteenths of an inch. The fore-wings, which have the costa abruptly bent at the base, are golden ochreous; there are three pinkish-golden darker-edged transverse bands on the basal area, the first very obliquely placed, its dorsal extremity meeting the second; a fourth very short band is situated on the costa beyond the middle; two black blotches near the apex, one containing a single pale purple spot, the other two spots, and a very large elongate black blotch near the termen containing three purple spots. The hind-wings are dark purplish-grey.

The perfect insect appears from the middle of October until January, and is found in damp sunny places on the edges of forest. This species is very interesting from the strong tendency of the markings to approach those of *Glyphipteryx*.

MICROPARDALIS AURELLA.

(*Sabatinea aurella*, Huds., Ent. Mo. Mag., liv., 62.)

(Plate XLVI., fig. 20 ♀.)

This extremely handsome species was discovered by Mr. R. M. Smiley near the mountain house, Mount Holdsworth, Tararua Range, at an elevation of about 2,500 feet

above the sea-level. It has also occurred on Mount Egmont, at about 3,000 feet, and at Gollan's Valley near Wellington. In the South Island it has been found on the Dun Mountain near Nelson (2,000 feet), on Mount Arthur (3,000 feet) and at Arthur's Pass.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings, which have the costa very abruptly arched at the base and the termen very oblique, are bright golden-ochreous with the veins well marked and deeply depressed; there is a large crimson-orange-metallic basal patch, purple on the costa; a curved transverse band at about $\frac{1}{2}$ deep crimson-purple-metallic on the costa, metallic-blue below the middle and crimson on the dorsum; another narrower band at about $\frac{1}{2}$ deep purple on the costa, thence brilliant metallic-blue to the dorsum; two long costal bars beyond this purple on the costa, pale metallic blue towards the disc; an irregular confluent series of crimson and metallic-blue spots on the termen; the cilia are golden-ochreous. The hind-wings are blackish with strong purple reflections. The head and thorax are clothed with long rusty-orange hairs. The abdomen is blackish. The antennae are orange, black towards the apex.

The perfect insect appears from the beginning of October until the middle of January, and may be looked for in damp sunny places, near the edges of beech forests, usually at considerable elevations.

Genus 3.—SABATINCA, Walk.

Mandibles developed. No tongue. Labial palpi rudimentary. Maxillary palpi long, folded. Middle tibiae with apical bristles, without spurs. Fore-wings with veins 7 and 8 stalked. (Plate A., figs. 14, 15, 16 neuration and head of *Sabatınca incongruella*).*

This is the most primitive genus of Lepidoptera at present known. Besides the following sixteen species two species are known from Australia. Of the New Zealand species four are confined to the North Island; eleven to the South Island and only one is recorded from both islands.

SABATINCA ROSICOMA.

(*Sabatınca rosicoma*, Meyr., Trans. N.Z. Inst., xvi., 118.)
(Plate XXXIX., fig. 20 ♀.)

This species was discovered at Kaco, North of Auckland.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rich glistening purple; there is a large triangular cream-coloured spot on the dorsum beyond the middle reaching half-way across the wing. The hind-wings are grey with strong purple reflections. The antennae of the male are greyish, of the female cream-coloured with two broad blackish bars.

The perfect insect appears in January, frequenting forest. It is practically impossible to see on the wing and is best obtained by sweeping.

*For detailed account of the neuration of the species included in this genus, and the closely allied genus *Microparadalis*, see paper by Mr. Philpott in Trans. N.Z. Inst., liv., 155. Mr. Philpott has also described the genitalia of *Sabatınca* etc. in Trans. Ent. Soc. Lond., 1923, pp. 347-366 and an abdominal scent-organ in the same Transactions, 1924, pp. 457-461. The wing-coupling apparatus is described by the same author in Proceedings of Australasian Association for Advancement of Science, 1923, pp. 414-419.

SABATINCA ZONODOXA.

(*Sabatınca zonodoxa*, Meyr., Trans. N.Z. Inst. xx., 91;
Gen. Ins. cxxxii., f. 3.)
(Plate XXXIX., fig. 21 ♀.)

This beautiful little insect has occurred on the Waitakerei Ranges near Auckland.

The expansion of the wings is about $\frac{1}{2}$ inch. The fore-wings are rich glistening purple; there is a broad cream-coloured bar across the wing before the middle and a small cream-coloured mark on the costa at about $\frac{1}{2}$. The hind-wings are grey with strong purple reflections.

The perfect insect appears in December and January and is found in forest. It is very closely allied to *S. rosicoma*, but easily distinguished by the conspicuous transverse bar on the fore-wings.

SABATINCA IANTHINA.

(*Sabatınca ianthina*, Philp., Trans. N.Z. Inst., lili., 342.)
(Plate XLIX., fig. 24 ♀.)

This very handsome species was discovered by Mr. Philpott, in a restricted spot, on the Dun Mountain track near Nelson, at an altitude of about 2,000 feet above the sea-level. It has also occurred on Gordon's Pyramid near Mount Arthur.

The expansion of the wings is $\frac{3}{4}$ inch. The fore-wings are deep glistening purple with brilliant blue reflections; there is a small creamy-white patch at the base, a very conspicuous outwards-curved creamy-white bar across the middle; two small crescentic marks on the costa beyond this and three small whitish marks on the termen. The hind-wings are dark grey with strong purple reflections. The head and prothorax are clothed with long shaggy rust-coloured hairs.

This species somewhat resembles *Sabatınca zonodoxa* but differs in its much larger size, narrower transverse band, presence of two white markings on outer half of costa and much more hairy head and prothorax.

The perfect insect appears in November, and was found on a rocky slope covered with various species of mosses and liverworts.

SABATINCA DEMISSA.

(*Sabatınca demissa*, Philp., Trans. N.Z. Inst., liv., 154.)
(Plate XLIX., fig. 15 ♀.)

This species was discovered by Dr. Tillyard at Tara-wera.

The expansion of the wings is $\frac{1}{2}$ inch. The fore-wings are lanceolate, very acutely pointed; pale brownish-ochreous thinly speckled with black and with golden reflections; there is a blackish spot in the disc before the middle and a series of minute black spots around the entire margin of the wing; the cilia are ochreous finely barred with blackish. The hind-wings are grey speckled with darker grey, with purplish reflections. The head is clothed with shaggy rust-red hairs. The antennae are reddish-ochreous with three black bars. The legs are reddish-ochreous barred with black.

The perfect insect appears in November.

Described and figured from a slightly worn specimen in the Cawthron collection.

SABATINCA QUADRIJUGA.

(*Sabatınca quadrijuga*, Meyr., Trans. N.Z. Inst., xliv., 126.)

(Plate XXXIX., fig. 25 ♀.)

This rather dull-coloured species was discovered by Mr. Philpott at West Plains near Invercargill. It has also occurred at Dunedin.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings are dull brownish-grey with faint golden and purplish reflections; there are four very large dull ochreous spots on the costa, becoming smaller towards the apex and several very indefinite ochreous marks in the disc. The hind-wings are very sparsely scaled; pale grey, darker near the apex, and with faint purplish reflections. The cilia of all the wings are grey, obscurely barred with dull ochreous.

The perfect insect appears in October. It is found on the bare dry ground under *Podocarpus dacrydioides* and other trees.

Described and figured from a specimen in Mr. Philpott's collection.

SABATINCA CAUSTICA.

(*Sabatınca caustica*, Meyr., Trans. N.Z. Inst., xliv., 124.)

(Plate XXXIX., fig. 18 ♀.)

This species, which was discovered by Mr. Philpott at Seaward Moss near Invercargill, somewhat resembles *S. chrysargyra*, but is smaller with the fore-wings relatively narrower and more pointed. It has also occurred at the Bluff and on Longwood Range at an elevation of 2,500 feet above sea-level.

The expansion of the wings is slightly over five-sixteenths of an inch. The fore-wings are golden-ochreous irregularly shaded and mottled with coppery-red; there are obscure discal dots at about $\frac{1}{4}$ and $\frac{3}{4}$ and an apical dot, none of which are clearly visible except in certain lights; the cilia are golden-ochreous faintly barred with grey. The hind-wings are grey with faint bronzy-purple reflections; the cilia are golden-ochreous becoming grey towards the body.

There seems to be considerable variation, some specimens being extensively clouded with whitish and mottled with purplish-brown.

The perfect insect appears in October and November and is found amongst rough herbage in open situations.

SABATINCA CHRYSARGYRA.

(*Palacomica chrysargyra*, Meyr., Trans. N.Z. Inst., xviii., 182.)

(Plate XXXIX., fig. 17 ♂.)

This rather indistinctly-marked species has occurred on the Dun Mountain, Nelson, at about 2,000 feet, on the lower slopes of Ben Lomond, and on the Humboldt Range, Lake Wakatipu, at about 3,500 feet.

The expansion of the wings is about seven-sixteenths of an inch. The head and thorax are covered with long shaggy reddish-ochreous hairs. The fore-wings, which have the costa very abruptly arched at the base, the apex acute and the termen oblique, are dull golden-orange-brown with the veins finely marked in grey; there are two faint, dull white, broken, transverse bands, the first from $\frac{1}{4}$ of the costa to the tornus and the

second beyond this not reaching across the wing; there is a terminal series of whitish spots and one or two brownish marks near the apex. The hind-wings are grey with strong purple reflections, and the veins clearly marked in darker grey. The cilia of the fore-wings are golden-orange-brown; of the hind-wings golden-ochreous mixed with grey.

The perfect insect appears in December and January, and is found in sunny damp places in open forest at altitudes of from 1,000 to 2,000 feet above the sea-level.

SABATINCA PASSALOTA.

(*Sabatınca passalota*, Meyr., Trans. N.Z. Inst., liv., 169.)

(Plate XLIX., fig. 14 ♀.)

This species, which is very similar to *S. chrysargyra*, has occurred plentifully on the wooded slopes of Bold Peak, Lake Wakatipu, at an altitude of about 3,000 feet above the sea-level.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are ovate-lanceolate, pointed nearly from the middle; pale shining ochreous irregularly clouded with coppery-golden; there are purplish-black spots in the disc at about two-fifths and middle and a marginal series around outer two-thirds of costa and termen; some irregular whitish marks adjoin these. The hind-wings are grey with purplish reflections.

The perfect insect appears in January, and flies actively in broken sunshine, amongst moss, in the beech forest, near its upper limit, on the mountain side.

SABATINCA AURANTIACA.

(*Sabatınca aurantiaca*, Philp., Trans. N.Z. Inst., lv., 668.)

(Plate LI., fig. 25 ♀.)

This species was discovered by Mr. Philpott on the Dun Mountain, near Nelson, at an elevation of about 2,500 feet above the sea-level.

The expansion of the wings is considerably over $\frac{3}{4}$ inch. It is very like *Sabatınca passalota* and *S. chrysargyra*. Apparently the principal differences consist in the presence, on the fore-wings, of a large discal dot at about $\frac{3}{4}$; the much more conspicuous blackish markings on costa and termen, and the duller ground colour which, in certain lights, has bluish-purple reflections.

The perfect insect appears in December.

Described and figured from a rather damaged specimen in Mr. Philpott's collection.

SABATINCA AEMULA.

(*Sabatınca aemula*, Philp., Trans. N.Z. Inst., lv., 667.)

(Plate LI., fig. 26 ♂.)

This species was discovered by Mr. Philpott in the Cobb Valley near Mount Peel, Nelson.

The expansion of the wings is slightly over $\frac{3}{4}$ inch. Very like *Sabatınca chrysargyra*, from which it differs in the uniform golden-coppery colour of the fore-wings, with conspicuous black discal spots about $\frac{1}{4}$ and $\frac{3}{4}$; the apical half of the hind-wings is very deep purple.

The perfect insect appears in December.

Described and figured from a specimen kindly given to me by Mr. Philpott.

SABATINCA BARBARICA.

(Sabatinca barbarica, Philp., Trans. N.Z. Inst., 1, 132.)

(Plate XLVI, fig. 19 ♀.)

This rather obscure species was discovered by Mr. Philpott at Tisbury, near Invercargill.

The expansion of the wings is seven-sixteenths of an inch. The fore-wings, which have the apex very pointed, are golden-yellow mottled with reddish-brown near the base, on the dorsum and at the apex; there is a large blackish-brown spot near the middle of the wing and a much smaller spot before the apex. The hind-wings are grey slightly tinged with purple. The head and thorax are reddish. The antennae are also reddish tipped with black.

Evidently very closely allied to both *S. caustica* and *S. chrysargyra*. From the former it may be distinguished by its more distinct markings and from the latter by its narrower fore-wings.

The perfect insect appears at the end of November, and frequents forests near the sea-level.

Described and figured from a specimen kindly lent to me by Mr. Philpott.

SABATINCA INCONGRUELLA.

(Sabatinca incongruella, Walk., Cat., xxviii., 511; Meyr., Trans. N.Z. Inst., xlv., 124; Gen. Ins. cxxxii., f. 4; Palaeomicroa chalcophanes, Meyr., Trans. N.Z. Inst., xviii., 182.)

(Plate XXXIX, fig. 19 ♂.)

This very beautiful and interesting little insect appears to be fairly common and generally distributed in most wooded districts throughout the North Island. It is very abundant at Waimarino and Ohakune. In the South Island it has occurred at Nelson.

The expansion of the wings is nearly $\frac{1}{2}$ inch. The fore-wings, which have the costa strongly bent at the base and the termen very oblique, are shining metallic golden-green with three very faint coppery transverse lines from the costa at about $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{2}{3}$, converging in the disc above the tornus; there is also a very faint coppery shading on the costal edge and a broken line on the termen; three conspicuous blackish spots are situated on the costa at the commencement of the transverse lines, two close to the apex, and several smaller spots on the termen and dorsum. The hind-wings are dark grey with brilliant purple reflections. There is a large tuft of long golden-orange hairs on the front of the head and the antennae and legs are orange-yellow barred with black.

Mr. Philpott succeeded in rearing a female specimen of this insect from an oval cocoon attached to a species of liverwort. It is therefore probable that the larva feeds on liverwort.*

The perfect insect appears from the end of December until the end of January and is usually found in damp places in dense forests. It rests with the head considerably elevated; the wings closed, forming a very steep roof; the antennae extended and divergent; the insect being evidently very much on the alert and ready for instant flight. Like most of the members of this interesting group, this

species is almost invisible whilst winging its way through the sunshine and shade of the forest, and it is to this fact that it probably owes its safety from attack. On Table-top, Tararua Range, where the rainfall is extremely heavy, this insect may be found amongst tussock grass, at the upper edge of the forest, about 4,000 feet above the sea-level.

SABATINCA EODORA.

(Sabatinca eodora, Meyr., Trans. N.Z. Inst., 1, 134.)

(Plate XLVI, fig. 18 ♀.)

This brilliant-looking little insect was discovered in Shedwood Forest, near Tapawera, Nelson. It has also occurred on the Dun Mountain at about 2,000 feet, on D'Urville Island and at Picton.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The fore-wings, which have the costa strongly arched at the base and the termen oblique, are dull salmon-colour with vivid yellow and black markings; the basal, median and subterminal areas are irregularly speckled with pale orange-brown; there are two very large yellow blotches on the costa before the middle and four minute yellow bars beyond the middle, all these are more or less margined with black scales; four minute black-edged yellow bars are situated on the dorsum as well as two or three patches of black and yellow scales in the disc; there is an irregular ring of black scales on the subterminal area and a small cluster of black scales at the apex; the cilia are brilliant yellow barred with black. The hind-wings are blackish with purple reflections; the cilia are blackish with two broad yellowish bars on the costa. The head is clothed with extremely long tufted dull yellowish-green hairs and the thorax with shorter hairs. The antennae are bright yellow with black apex and subapical bar.

The perfect insect appears early in January, and frequents ferns in damp parts of the forest. It is extremely local and of a retiring habit. Hence it can only be obtained by careful sweeping.

SABATINCA AEENEA.

(Sabatinca aenea, Huds., Ent. Mo. Mag., lix., 181.)

(Plate XLVII, fig. 12 ♂.)

This very distinctly-marked species was discovered by Mr. S. Lindsay at Governor's Bay, near Christchurch. It has also occurred on the Lyttelton Hills and on Mount Grey, North Canterbury.

The expansion of the wings is slightly over $\frac{1}{2}$ inch. The head and anterior portions of the thorax are thickly clothed with shaggy rust-coloured hairs. The abdomen is blackish. The legs are black barred with golden-ochreous-brown. The antennae are rather long, black reddish at base. The fore-wings have the costa strongly arched near the base, the apex acute and the termen oblique; pale golden-ochreous with black markings; a small blotch on the costa at the base; a broad strongly-curved band extending from the costa at $\frac{1}{4}$ half-way to tornus; a second band, shorter and straighter, from costa before middle to disc; a short, much narrower band from costa beyond middle; a series of irregular slender blackish markings around outer third of costa, termen and in disc beyond middle; a broad cloudy blackish patch on dorsum, extending half-way from base to tornus; between the black markings much of the ground colour has faint

*Trans. N.Z. Inst., liv., 154; Trans. Ent. Soc. Lond., 1922, 445.

whitish reflections, tending to form pale transverse bands. The cilia are golden-ochreous, with blackish bars. The hind-wings are dark grey, with strong purple reflections; the cilia are pale golden-ochreous, except near the body.

The perfect insect appears in October.

Described and figured from specimens kindly given to me by Mr. Lindsay.

SABATINCA LUCILIA.

(*Sabatinka lucilia*, Clarke, Trans. N.Z. Inst., lii., 35.)

(Plate XLIX., fig. 9 ♂.)

This large and very beautiful species was discovered by Mr. C. E. Clarke at Waitomo. He has likewise taken it at Kauri Gully, near Auckland. It has also occurred at Waimarino.

The expansion of the wings is slightly under $\frac{1}{2}$ inch. The fore-wings are *pale pinkish-ochreous darker towards the base* and with faint purplish reflections beyond the middle; *there is a very heavy transverse bar from about $\frac{1}{3}$ of costa to about $\frac{1}{2}$ of dorsum composed of densely agglomerated black scales*; another very broad irregular transverse marking extends from the middle of the costa to the tornus and is composed of scattered black scales, densest on its margins, the central portions being more or less covered with scattered brown scales; there is a similar but much smaller marking from the costa just before the apex to about the middle of the termen; this joins the previous marking and thereby encloses three more or less oval patches of the ground colour. The hind-wings are grey with strong purple reflections. The head is *brown clothed with extremely long shaggy hair*. The thorax and abdomen are also brown. The antennae are *brown tipped with black*.

The perfect insect appears in December and January, frequenting forest. It is attracted by light.

Described and figured from the type specimen in Mr. Clarke's collection.

SABATINCA CALLIARCHA.

(*Sabatinka calliarcha*, Meyr., Trans. N.Z. Inst., xlv., 124.)

(Plate XXXIX., fig. 28 ♂.)

This very handsome and interesting species, which was discovered by Mr. Philpott, has occurred at Pieton, Wallacetown near Invercargill, Blue Cliff and Sandhill Point, Fiord County.

The expansion of the wings is seven-sixteenths of an inch. *The head is clothed with very long, shaggy, reddish-brown hairs* and the thorax with shorter hairs. The fore-wings, which have the costa strongly arched at the base, *are bronzy-greenish-brown*; there is a narrow curved pinkish-silvery transverse line on the dorsum near the base; *two very broad convergent pinkish-silvery bands at $\frac{1}{3}$ and $\frac{2}{3}$ and two short irregular bars on the costa between these*; three small black marks followed by pinkish-silvery blotches are placed near the apex and *four very large partially-confluent black spots on the termen below the apex*, as well as one or two minute black spots in the disc and on the edges of the transverse bands. The hind-wings are deep purplish-black.

The perfect insect appears in December and January, and is found in damp forests. When resting on stones covered with glaucous-green algae it is extremely hard to see, the colouring of the fore-wings being highly protective in such situations. If disturbed it takes wing and flies rapidly for a short distance, when it again alights. It is almost invisible when on the wing. Although usually considered a very rare insect it occurs quite plentifully, in wet rocky places, in the forest-clad country, immediately around Pieton.

Described and figured from a very perfect specimen kindly lent to me by Mr. Philpott, prior to the discovery of the insect at Pieton.

CENSUS OF SPECIES.

	Restricted to North Island	Restricted to South Island	Common to Both Islands	Restricted to Chatham Islands	Restricted to Sub Antarctic Islands	TOTAL	Species com- mon to Aus- tralia & N. Z. (included in total)
BUTTERFLIES	—	3	12	—	—	15	7
SPHINGIDAE	—	—	2	—	—	2	2
ARCTIADAE	—	4	2	—	—	6	1
NOCTUIDAE	13	39	81	1	2	136	22
GEOMETRIDAE	18	100	118	4	3	243	8
PYRALIDAE	14	109	91	2	1	217	13
THYRIDIDAE	—	—	1	—	—	1	—
PTEROPHORIDAE	—	8	8	—	—	16	2
PSYCHIDAE	—	1	1	—	—	2	—
TORTRICIDAE	29	62	45	—	1	137	9
AEGERIADAE	—	—	1	—	—	1	1
TINEIDAE	106	162	182	2	—	452	28
HEPIALIDAE	5	11	4	—	—	20	—
MICROPTERYGIDAE	5	13	5	—	—	23	—
Total	190	512	553	9	7	1271	93

Of the 93 species common to Australia and New Zealand at least 29 species have been introduced by human agency, and 8 are cosmopolitan species.

APPENDIX.

BY STELLA HUDSON.

A BRIEF DESCRIPTIVE LIST OF THE PLANTS MENTIONED IN THIS WORK.

THE following list of trees, shrubs, etc., has been prepared to assist entomologists in recognising the various foodplants mentioned in connection with the insects described in the foregoing pages. In order to meet the requirements of beginners all botanical terms have been omitted. Those desiring precise scientific information on these plants will of course consult works specially dealing with botany. The names of the insects feeding on each plant are given after the description. Names of species which have been observed attached to a plant, but are not known to actually feed thereon, are followed by an asterisk.

ACACIA. The genus of Wattles. *Dasydopia sclenophora*; *Parectopa citharoda*.

ACIPIHYLLA SQUARROSA (Spear-grass, Spaniard, Kuri-kuri, Taramea). A plant often found on the sea-coast, or open hilly country, with long, very sharp spines instead of leaves. The flowers are very small, and are placed round a tall central shoot, which is also covered with spines. *Aletia nullifera*.

ADIANTUM (Maiden hair ferns). These ferns resemble the well-known maiden hair of the greenhouse, but they have larger and darker green leaves. *Musotima aduncalis*; *M. nitidalis*.

ALECTRYON EXCELSUM (Titoki). A moderate-sized tree with rather long, toothed leaves. The flowers, fruit and branches are clothed with a rusty-coloured down. The fruit has a very remarkable appearance; it consists of a shining black seed, partially surrounded by a bright red fleshy covering. *Acrocerops cyanospila* (in berries); *Hepialus virescens* (in woody stems).

ALSOPIHIA COLENSOL. A small prostrate tree-fern rarely more than 5 feet high. It is densely clothed with reddish-brown hairs. *Scridosema peltigata*; *Azelina variabilis*.

AMPELOPSIS HEDERACEA. The Virginia Creeper. *Deilephila ceterio*.

APOCYNUM (Dog bane). These are climbing plants with a bitter milky juice. The leaves are entire and opposite each other on the stems which are usually knotty. The flowers are in clusters and the central part is of a very peculiar structure. *Danaïda plexippus*.

ASTELA COCKAYNEL. A terrestrial sub-alpine stemless plant with silvery sword-like leaves 2-3 feet long radiating from the centre of the plant. *Charixena iridoza*.

ASTELA SOLANDRI (Kahakaha). A plant found growing on the stems of large forest trees. It has very long, narrow, dark green leaves springing from the base of the plant, and lemon-coloured flowers arranged on a long, silky stem. The berries are bright crimson. *Leucania purdii*; *Scridosema indistincta*; *Barea dinocosma*;* *Amphixystis hapsimacha*;* *Prothinodes grammocosma*.*

AUSTRALINA PUSILLA. A small, creeping, very slender herb with rounded downy leaves about $\frac{1}{2}$ inch long. It is found in dark shady forest. *Mecyna marmarina*.

BEILSCHMIEDIA TAWA (Tawa tree). A handsome tree, with very long, narrow, light green leaves, slender branches, and smooth bark. *Scridosema suavis*; *Declana floccosa*.

BETULA ALBA. The English Birch. *Hepialus virescens*.

BRACHYLOTTIS REPANDA (Wharangi, Rangiora). One of the early flowering shrubs, with large bunches of small, strong-scented, white flowers. The leaves are large and pale green, the under-side being white. *Nyctemera annulata*; *Chloroclystis semialbata* (on flowers); *Scridosema rudiata*; *Ctenopseustis obliquana*; *Borkhausenia bacilla*;* *Gymnobathra flavidella* (in dead twigs); *Simaethis combinatana*; *Nepticula cyprama*; *N. perisopa*.

CALYSTEGIA SEPNUM (Convolvulus, bindweed, pohue, panahe). A climbing plant with large funnel-shaped white or pink flowers, and soft heart-shaped leaves. *Sphinx convoluti*; *Bodellia somnulentella*.

CARDUUS PALASTRIS (Marsh thistle). A very common plant in open fields. It is smaller and more prickly than the Scotch thistle. *Vanessa cardui*; *Choreutis bjerkandrella*.

CAREX. A large genus of grass-like "sedges." The stems are usually cylindrical or three-angled and often rough to the touch. *Hydriomena siria*;* *Protosynaema quaestuosa* (on *C. Solandri*).

CARMICHAELIA, or New Zealand Broom. A genus of shrubs closely resembling the common broom, but with very small flowers, more or less streaked with blue or lilac. *Scridosema scariphota*; *Mecyna maoriatis*; *Ortheneches chlorocoma*.

CARODETUS SERRATUS (Puti-puti-weta). A pretty shrub or small, flat-topped tree with rather small, serrated, bright green leaves marbled in appearance, and numerous clusters of small whitish fragrant flowers, followed by nearly globular hard green fruits. *Melanchnra ochthistis*; *Ctenopseustis obliquana*; *Hepialus virescens* (in stem).

CASSINA LEPTOPHYLLA (Tauhinu, or Cotton Wood). A shrub usually growing in rather exposed places. The leaves are very small, pointed, dull bluish-green above and white underneath.

ARUNDO CONSPICUA (Toe Toe). The largest native grass. It is found in swampy situations where it grows in clumps seven or eight feet high. The fluffy ochreous plumes are on stems about ten feet long. *Dipaustica cypriatra*; *Persectania stercoratis*; *Catantacha lotinana*; *Crambus angustipennis*;* *Megacraspedus calanogona*; *Erechthias hemiclistra*.

ASCLEPIAS (Milkweed).

They are placed very closely on the stems, which are also white. The flowers are dull yellowish-white, and grow in terminal flat-topped clusters. *Melanchnra homoscia*; *Sclidosema rudata*; *Harmoloba sisyrana*; *Heliosibes atychioides*; *Oeceticus omnivorus*.

CELMISIA. The genus of Mountain Daisies. These beautiful herbs constitute the most conspicuous portion of the N.Z. alpine flora. *Apatetris melanombra*; *Nepticula oriatra** (on *C. coriacea*).

CINERARIA MARITIMA. A common garden or hothouse plant. *Nyctemera annulata*.

CNICUS LANCEOLATUS (The Spear Thistle). *Heliopsis armigera* (on the flowers).

COMPOSITAE (The Daisy family). *Chorocutis bjerkandrella*.

COPROSMA AREOLATA. A small tree with tangled branches and small leaves. It has small greenish flowers and purplish-black berries. This plant is usually found on the outskirts of lowland forests. *Chloroclystis sandycias*; *Eucymatoge gobiata*.

COPROSMA GRANDIFOLIA (Kanono, manono). A large shrub with very large marbled leaves, dense masses of small greenish flowers and bright orange-red berries which are often borne in great profusion. *Alucita lycosoma*; *Acrocercops zoriocella*.

COPROSMA PARVIFLORA. A very leafy shrub with horizontally spreading branches. The leaves are very small and grow in little bunches along the stems. It is common in lowland forests and also on the mountains. The berries are violet-blue to black. *Xanthorrhoe prasinias*;* *Protosynaema eratopis*.*

COPROSMA ROBUSTA (Karamu). A large straggling shrub with dark green glossy leaves. The small greenish-yellow flowers grow in compact clusters round the stem. The berries are bright orange-red and are often very abundant. *Eucymatoge anguligera*; *Hydriomena similata*; *Acrocercops zoriocella*.

COPROSMA ROTUNDIFOLIA. A straggling shrub with interlacing branches and small almost round soft leaves often blotched with purple. The flowers are minute and the fruit small and red. It is usually found in damp bush. *Chloroclystis sandycias*; *Eucymatoge anguligera*; *Hydriomena similata*; *H. callichlora*; *Tortrix charactana*; *Ctenopseustis obliquana*.

CORDYLINA AUSTRALIS (Cabbage tree, Ti-kouka). This is one of the most remarkable-looking trees in New Zealand. It much resembles a palm in general appearance. The leaves are long and narrow, with parallel veins; the flowers are whitish, very numerous, growing in drooping clusters at the top of the tree. *Venusia verriculata*; *Prothinodes grammocosma*.*

CORIARIA RUSCIFOLIA (Tupakihi, tutu). A small tree with shining leaves and very long drooping branches from which hang slender stems covered with tiny greenish flowers and, later, crimson and purple berries of a poisonous nature. *Sclidosema dejectaria*; *Declana floccosa*; *Heliosibes illita*;* *Zelleria copidata*;* *Gracilaria clausa*; *Eschatotropa derogatella*.*

CORYNOCARPUS LAEVIGATA (Karaka). A handsome tree with large dark green shiny leaves and clusters of bright orange fruit. It is usually found near the sea coast. *Lysiphragma mirochloa* (under bark).

CRUCIFERAE. A large family of herbs including cresses, shepherd's purse, cabbages, turnips, wallflowers, etc. *Plutella maculipennis*.

CUCURBITACEAE (The Melon family). *Hymenia fasciata*.

CUPRESSUS MACROCARPA. A very common hedge-plant. *Sclidosema dejectaria*; *S. suavis*; *Declana floccosa*; *Heliosibes atychioides*; *Oeceticus omnivorus*.

CYATHEA DEALBATA (Silver tree fern, Ponga). A large tree fern, growing from ten to forty feet high, with a slender black stem, and dark green fronds silvery underneath. *Sclidosema aristarcha*; *Azelina variabilis*; *Tortrix torogramma*;* *Batrachedra filicicola*;* *Orthenches drosocalca*.

CYCLOPHORUS (POLYPODIUM) SERPENS. A very common tree- and rock-climbing fern with small thick fleshy rounded leaves. *Phibocryptica polypodii*.

CYTISUS SCOPARIUS. Common Broom. Also known as GENISTA SCOPARIUS and as SAROTHAMNUS SCOPARIUS. *Mecyna maialis*; *Oeceticus omnivorus*; *Ctenopseustis obliquana*; *Catamacta gavisana*.

DACRYDIUM CUPRESSINUM (Rimu, Red Pine). One of New Zealand's most beautiful and graceful forest trees. It has pale green pendant branches. The leaves are small prickles, growing closely together. The bark is flaky. *Sclidosema fenerata*; *Capua plinthoglypta*; *Izatha convulsella* (under bark); *Isonomentis amauropa* (under bark).

DICKSONIA SQUARROSA (Weki, wheki). A tall tree fern with a slender black trunk and harsh fronds. *Azelina variabilis*; *Porina signata* (roots).

DISCARIA TOUMATOU (Wild Irishman, Tumatakuru). A straggling shrub, or small tree, often common in dry, open places. It is furnished with numerous long sharp spines, with several very insignificant flowers and leaves at the base of each spine. *Xanthorrhoe aegrotas*;* *Orophora unicolor*;* *Harmoloba scolostis*;* *Harmoloba oblongana*.

DROCHOPHYLLUM LONGIFOLIUM (Inanga, Grass tree). A shrub or small tree, usually found in mountainous districts, with long, very narrow, grass-like leaves, and small white Heath-like flowers. *Ichneutica dione*;* *Aletia obscurata*;* *Chloroclystis clarkii*;* *Venusia charidema*;* *Oeceticus omnivorus*.

DRYOPTERIS PENNIGERA. An abundant fern by the sides of streams in wooded gullies. It has soft pale green fronds from 2-5 feet long and sometimes a very short trunk. *Azelina gallaria*.

DYSOXYLUM SPECTABILE (Kohe-kohe, N.Z. Cedar). A very handsome tree with large glossy leaves consisting of three to four pairs of leaflets and stems of white flowers springing from the bare branches. The fruit bursts open and shows a scarlet covering to the black seeds. *Epalziphora azeuana*.

ELAEOCARPUS DENTATUS (Hinau). A shapely tree with long, narrow, leathery leaves with recurved margins. In November it bears quantities of drooping cup-shaped cream flowers resembling sprays of the Lily of the Valley. The fruit is like a small purple plum. *Izatha attactella* (in dead branches).

ERECHTITES PRENANTHOIDES. A common herb, 2-3 ft. high, often abundant in bush-clearings. It resembles a tall slender groundsel. *Nyctemera annulata*; *Simaethis combinatana*; *Plutella maculipennis*;* *Nepticula erechitius*.

ERYTHRAEA CENTAURIUM (The Centaury). This little gentian is common in open places. It is about 1 ft. high and bears flat-topped clusters of pretty little pink flowers. *Stenoptilia zophodactyla*.

EUCALYPTUS. The genus of Gum-trees. *Parocystola acroantha*; *Barca confusella*.*

FREYGINETIA BANKSII (Kie-kie, Tawhara). A lofty forest climber with narrow harsh leaves 2 ft. long, growing at the ends of long cable-like stems. The flowers are in spikes, surrounded by large white fleshy leaves. The fruit (Ureure) is a green oblong mass. *Hepialus virescens* (in stems).

FUCHSIA EXCORTICATA (our native Fuchsia, Kotukutuku). A very common tree or shrub growing in the forest. The bark is pale reddish-brown; the leaves rather elongate, dark green, with pale under-side. The flowers closely resemble those of the cultivated fuchsia, but are less brightly coloured. This plant partially sheds its leaves in winter. The fruit, known as the Konini, is dark purple. *Deilephila ceterio*; *Melanchnra plena*; *Sclidosema dejectaria*; *Oncophasia imbriferana* (in dead branches); *Gymnobathra bryaula* (ditto); *Izatha caustopa* (ditto); *I. epiphanes* (ditto); *Eulechria zophocessa* (ditto); *Lysiphragma epizyla* (ditto).

GAHNIA SETIFOLIA (Sedge). A large, grass-like plant growing in clumps, with very long, dark green leaves, which cut the fingers unless the plant is carefully handled. A number of small, brown flowers is situated near the top of a tall stem, in the centre of each clump. *Dodonidia helmsi*; *Olepisosma iridia*; *Glyphipteryx calliactis*; *G. leptosema*.

GALIUM VERUM (Yellow bedstraw). A small perennial with dense masses of tiny yellow flowers. The leaves are arranged round the stem in circles. *Deilephila celerio*.

GAYA LYALLI (South Island ribbon-wood or lace-bark). A small tree found in the mountainous districts of the South Island. Its leaves are pale green, very soft, with toothed edges. The flowers are numerous and superficially resemble those of the cherry. This is one of the few N.Z. trees which sheds its leaves in the winter. *Melanchnra merope*; *Venusia undosata*; *Scoparia chilamdyota*; *Carposina moribida*; *Anisoplatea achy-rata*; *Lysiphragma howesii*.

GENIOTOMA LIGUSTRIFOLIUM. A forest shrub somewhat resembling the English privet, with soft shining pale green leaves and clusters of very small white or green fragrant flowers growing in the axils of the leaves. *Asaphodes megaspilata*.

GERANIACEAE. The Geranium family. *Heliopsis armigera*; *Plusia chalcites*; *Tortrix postvittata*.

GRAMINEAE. (The Grass family). *Metuaria strategica*; *Leucania semivittata*; *Alectia unipuncta*; *Alectia griseipennis*; *Persec-tania composita*; *Borkhausenia chloradelpha* (roots); *Protosyn-naema scopuchua*; *Porina dinodes* (roots); *P. cervinata* (ditto); *P. umbraculata* (ditto).

GRISELINIA LUCIDA (Broad-leaf, Puka). A small, stout spreading tree found growing on rocks or on the branches of tall trees. It is easily distinguished by its very large glossy leaves. *Hepialus virescens* (in stems).

GRISELINIA LITTORALIS (Broad-leaf, Papauma, Puka, Kapuka). A round-headed tree with a short gnarled trunk and furrowed light brown bark. The large oval leaves are yellowish-green and glossy. *Lysiphragma epixyla* (under bark).

HALORAGIS ERRECTA (Toatoa). An herbaceous plant locally abundant on dry hills and on the sea coast; the leaves are deeply indented, slightly rough, and arranged on opposite sides of the stem. The flowers are small and green; the fruit is a nut with small wings attached. *Euchocca rubropunctaria*.

HIBBERTIA LINEARIS. An erect shrub with yellow solitary flowers with many stamens and pale green leaves about an inch long. It is a native of Australia. *Tortrix indigestana*.

HISTIOPTERIS INCISA. A soft, light green, straggling fern, 1-3 ft. high, growing in open places in the forest, and round decayed logs. *Sestra flexata*; *Musotima nitidalis*.

HOHERIA POPULNEA (Houli, whauwhi, houhere, lace bark, ribbon wood). A small tree with tough toothed leaves. The snow-white flowers are produced in bunches of 5-20 in the axils of the leaves. *Venusia undosata*.

JUNCUS TENUIS. A small rush growing in tufts about a foot high. *Platyptilia acolodes*; *Bactra noteraula*; *Batrachedra arenosella*; *Pantoperma holochalca*; *Glyphipteryx iocheucra*.

KNAUTIA AURENSIS (Field scabious, "Pincushion"). An introduced garden plant. The flowers are of many different colours—the name "pincushion," gives the best description of appearance. It is very attractive to insects.

LAURELIA NOVAE-ZEALANDIAE (Pukatea). A lofty tree growing in swampy forests. Its trunk is clothed with whitish bark and is flanked with thin spreading buttresses at its base. The leaves are oval, tough and glossy. *Lysiphragma epixyla* (under bark).

LEPTOPTERIS HYMENOPHYLLOIDES. One of the "crape" ferns, growing in very shady places in the forest. It has soft, graceful, dull green fronds. *Scidosema pelturata*.

LEPTOSPERMUM ERICOIDES (Kanuka, maru. Tree manuka). A much larger tree than *L. scoparium* with narrower leaves and

smaller flowers. The leaves are greener and the flowers whiter than those of *L. scoparium*. *Asthena subpurpurata*; *A. schistaria*; *Hybemia indocilis*; *Declana leptomera*; *D. junctilinea*; *D. floccosa*; *Oeceticus omnivorus*; *Hepialus virescens* (in stems).

LEPTOSPERMUM SCOPARIUM (Manuka, Kahikatoa, Tea tree). A small tree, growing usually in poor soil. The leaves are very small and dull green, and the numerous star-like flowers are white, tinged with pink. *Asthena subpurpurata*; *A. schistaria*; *Hybemia indocilis*; *Scidosema suavis*; *Declana leptomera*; *D. floccosa*; *D. junctilinea*; *Oeceticus omnivorus*; *Tortrix excessana*; *Carposina cryodana*; *C. charaxius*; *Harmoloba oblongana*; *Spilonota zopherana*; *S. ejectana*; *Thiotricha tetrachala*; *Zapp-rastra calliphana*; *Borkhausenia apanthes*; *B. perichlora*; *B. nycteris*; *B. brachyacma*; *Heliothibes atychioides*.

LEUCOPOGON FASCICULATUS (Mingimingi). A heath-like shrub, often mistaken for Manuka, amongst which it usually grows. The minute white flowers hang in little clusters from the ends of the twigs. The tiny berries are crimson or orange. *Chloroclystis clarkei*; *Asthena pulchra*; *Xanthorhoe obarata*; *Scidosema suavis*; *Spilonota parthenia*; *Hepialus virescens* (in stems).

LICHEN. *Dichromodes ida*; *D. gypsotis*; *Scenoploca petraula*; *Eurythecta zelaca*; *Cnephasia imbriferana*; *Taleporia microphanes*.

LONICERA PERICLYMENUM (Honeysuckle, woodbine). *Melanchnra ustistriga*; *Otenopseustis obliquana*.

MACROPIDER EXCELSUM (Kawa-kawa). A small succulent tree generally growing in damp places. The leaves are broad, heart-shaped, bright green, and nearly always riddled with holes. The plant bears slender orange-coloured catkins. *Scidosema panagrata*; *Epaltriphora axenana*; *Otenopseustis obliquana*.

MELICHTUS RAMIFLORUS (Mahoe or Ini-ini). A shrub or tree. The leaves are moderately toothed, bright green, and very pretty. The flowers are in clusters arranged round the smaller stems. They are greenish-yellow and emit a very sweet odour; the fruit is violet-coloured with black seeds. *Austranathes purpurea*; *Erana graminosa*; *Scidosema dejectaria*.

METROSIDEROS LUCIDA (South Island Mountain Rata, Iron wood). A tall, branching tree with small shining leaves, papery bark and dense terminal masses of scarlet flowers. It is abundant in the Otira Valley. A prostrate form is the chief component of the forest in the Auckland Islands.

METROSIDEROS ROBUSTA (The Common Rata). The rata sometimes grows as a lofty tree. It also grows in hilly bush as a bushy shrub. The flowers are abundantly produced and are scarlet. *Scidosema suavis*.

METROSIDEROS SCANDENS (White Rata, Aka). A common climbing shrub with small, roundish, glossy, dark green leaves and very numerous feathery white flowers. The seed has a powdery appearance, and is enclosed in a large capsule. The flowers are extremely attractive to insects. *Scidosema productata*; *S. suavis*; *S. dejectaria*.

MICROLAENA AVENACEA. A common grass in forest glades. It grows about 2 feet high and has long lax nodding pale green flower panicles. *Leucania sulcana*.

MOSS. *Diptychophora microrodora*; *D. metallifera*; *D. auriscriptella*; *D. claina*; *Scoparia phitorea*; *S. minusculalis*; *S. climeria*; *S. dinodes*; *S. characta*; *S. sabulosa*; *S. bisinualis*; *S. leucogramma*; *Tortrix molybditis*; *Endophtora omogramma*; *Archypala terranca*; *Mallotricha lapidosa*.

MUEHLENBERGIA. A common climbing plant, generally found near the edge of the forest. It has a very tangled growth. Leaves heart-shaped or broadly oblong; in young plants, three-lobed. Flowers in loose panicles, small, green. *Chrysophanus salustius*; *C. cynsi*; *C. boldenarum*; *Melanchnra ustistriga*; *Rhapha scotosialis*; *Chloroclystis muscosata*; *C. sphragitis* (on flowers); *Hydriomena lithurga*; *Scidosema indistincta*; *Mecyna*

flavidatis; *Morova subfasciata* (in stems); *Tortrix excessana*; *Thiotricha thorybodes*.

MYOPORUM LAETUM (Ngaio). A small tree, shapely when young but gnarled when old, with speckled sticky leaves, and white flowers spotted with lilac. This tree usually grows near the sea coast. *Tortrix excessana*; *Izatha attaccella* (in dead branches); *Hepialus virescens* (in stems).

MYOSOTIS PALUSTRIS. The marsh forget-me-not. *Utetheisa putchella*.

MYRTUS BULLATA (Ramarama). A remarkably pretty shrub with reddish-brown or green leaves, much crinkled. The flowers are white, tinged with pink, and very much resemble those of the English myrtle. Berries about the size of currants, red or purple. *Chlorocystis muscosata* (flowers); *Sclidosma panagrata*; *Ctenopseustis obliquana*; *Nymphostola galactina*.

NASTUTIUM OFFICINALE. Common water-cress. *Xanthorhoc rosaria*; *X. benedicta*.

NOTHOFAGUS (Native Beech, often wrongly called Birch. Tawhai). A genus of small-leaved trees allied to the Beeches (*Fagus*) of the Northern Hemisphere. *Tatosoma tipulata* (on *N. cliffortioides*, mountain beech); *Declana floccosa*; *Borkhausenia apertella*;* *B. phagophylla*;* *B. oxyina*;* *B. monodonta*;* *B. cymyilia*;* *B. hoplodesma*;* *Izatha attaccella* (in dead branches); *Proctodes cornifera*; *P. profunda*;* *Gracilaria sclenitis* (in *N. Menziesii*, silver-beech); *Nepticula lucida* (ditto); *Hepialus virescens* (in stems).

NOTHOFANAX ARBOREUM (Whauwhau-paku). A small tree common in lowland forests. Its leaves are divided into five or seven large dark green toothed leaflets. The stems are very brittle. Its large dark purple masses of little berries are most striking. *Epirrhanthis alectoraria*; *Declana atronivica*; *D. cyrgia*; *Tortrix excessana*; *Gymnobathra omphalota*; *Parectopa aellomata*; *P. aethalota*; *Circocera ditrocha*.*

OLEA CUNNINGHAMII (Maire, New Zealand Olive). A shrub or small tree with narrow leaves, and insignificant flowers growing on opposite sides of the flower-stalk. *Hepialus virescens* (in stems).

OLEARIA. A genus of small trees and shrubs with daisy-like flowers. The bark is usually somewhat flaky and the leaves generally have whitish undersurfaces. *Sclidosma radiata* (on *O. Forsteri*, Akeake); *Ctenopseustis obliquana* (on *O. Cunninghamii*, Heketara, etc.); *Apatetris melanombra* (on most species); *Thiotricha oleariae* (on *O. Solandri*); *Agriophara coricopa* (on *O. Cunninghamii*, Heketara, etc.); *Nepticula oggyia* (on *O. macrodonta*, etc.); *Nepticula fulva* (on *O. macrodonta*, etc.).

PAESIA SCABERULA. A small fern with reddish, wiry stalks and fluffy yellowish-green fronds. It usually grows in large patches on dry banks. *Paradectis porphyrias*.*

PARSONIA CAPSULARIS (Aka-kioere). A climbing plant with wiry stems, long narrow brownish-green leaves and clusters of very fragrant white flowers. The fruit is a narrow green pod several inches long. *Morova subfasciata* (in swollen stems).

PHORMIUM TENAX (N.Z. Flax, Harakeke). A remarkable plant, with tough shining leaves, several feet long, springing from the base of the plant. The flower stems are from 8 to 12 feet high. The flowers, which are placed round the stem, are narrow and of a reddish-brown colour. *Persectantia steropastis*; *Orthoclydon praepectata*.

PHYLLOCLADUS ALPINUS (Mountain totara, Tanekaha, Celery pine, N.Z. hickory). A small spreading tree found in almost all subalpine forests. Tough, lobed, flattened portions of the stem take the place of leaves at the base of which are little crimson cones. *Tortrix dolecania*; *Orthenches porphyritis*.

PIMELEA PROSTRATA. A small prostrate shrub with crowded bluish leaves, reddish-brown branches, and little clusters of cream-coloured, sweet-scented flowers, somewhat resembling *Daphne*, borne at the ends of the branches. It is common on

dry hillsides, especially near the sea. *Melanchna rhodopleura*; *Notoreas perornata*; *Tortrix indigestana*.

PINUS RADIATA (Monterey pine). A very common pine tree introduced from California. *Oeceticus omnivorus*.

PITTIOSPORUM EUGENIODES (Tarata, Mapau, Maple, Lemon Tree). A shrub or small tree, with rather elongate, pale green wavy leaves, and bunches of fragrant, small, yellow flowers. The bark is pale and often prettily mottled. *Epirrhanthis ustaria*; *Izatha ciphancs* (in dead branches); *Nymphostola galactina*.

PITTIOSPORUM TENUIFOLIUM, var. **NIGRESCENS** (Tawhiwhi Kohuhu, erroneously called Matipo). A very ornamental shrub with small, shining, bright green wavy leaves, and black stems. The flowers are dark purple, and rather buried among the foliage. It is a common hedge plant. *Epirrhanthis ustaria*; *Epicorista allogama*;* *Izatha ciphancs* (in dead branches).

PLAGIANTHUS BETULINUS (Lace-bark, Ribbon-wood, Manatu). When young *P. betulinus* forms a straggling shrub with interlacing branches and small soft, notched leaves. When mature it is a handsome leafy tree with terminal clusters of small whitish yellow flowers. *Venusia undosata*; *Hepialus virescens* (in stems).

PLANTAGINACEAE (The Plantain family). Plantains are small herbs resembling a dandelion in size, habitat, and manner of growth. The flowers are minute and grow very close together round the apex of the flower stalk—thus forming a knobby-looking spike. *Melanchna mutans*; *Hydriomena deltoidata*; *Leptomeris rubriaria*.

PLATYCIERIUM GRANDE. An Australian fern found growing on trees. It has two kinds of fronds. The outer, sterile, spreading fronds are 2 feet in diameter and deeply lobed. The inner, fertile, pendulous fronds are 6 feet long. *Calicotis crucifera*.

PLEUROCOCCUS VULGARIS (Green algae). This plant has the appearance of fine green dust. It grows on the shady side of fences and is especially noticeable in wet weather. *Scoriodyta conisalia*.

PLEUROPHYLLUM SPECIOSUM. A noble plant confined to the Auckland and Campbell Islands. The leaves are ribbed, about fourteen inches long by eight broad, and form a rosette. The flowers are borne on a tall stem rising from the centre of the rosette. They are daisy-like and are pale purple with dark purple centres. *Tortrix syntona*.

POA CAESPITOSA (Tussock). One of the common native grasses of New Zealand. It grows in large clumps, often about two feet high. It is especially common in open situations in the South Island. *Argyrophenga antipodum*; *Leucania phaula*; *Crambus simplex*; *Oreophora unicolor*.*

POA COLENSOI. A very common grass on mountain slopes. It covers large areas and forms a very slippery carpet. The leaves are pale greenish-ochre and very wiry. *Erebica pluto*;* *Orocrambus mylites*.*

PODOCARPUS DACRYDIODES (White Pine, Kahikatea). A stately tree, sometimes branchless for 70 or 80 feet. The trunk is light in colour. The leaves are scale-like and the berries are red. This tree usually grows in swampy situations. *Gymnobathra cenchrias*;* *Orthenches drosachala*.

PODOCARPUS FERRUGINEUS (Miro, Black Pine). A handsome tree with greyish-black flaky bark, small narrow-pointed leaves set in two horizontal rows on the branches, and large purplish berries. *Sclidosma laucelaca*.

PODOCARPUS TOTARA (Totara). One of New Zealand's finest forest trees. The bark is papery and reddish; the wood is dark red and extremely durable. The rusty-green leaves are stiff and narrow with sharp points. *Sclidosma laucelaca*; *Eutornu caryochroa*;* *Orthenches porphyritis*.

POLYPODIUM DIVERSIFOLIUM. A very conspicuous fern found creeping over the ground, rocks and logs in windy bush. The fronds are large—often one foot long—and leaf-like. They are

bright, shining green with well-marked dark green veins, and are usually irregularly lobed. It is extremely common in the forest on the Auckland Islands. *Gargaphia muriferata*; *G. neoselena*;^{*} *Thylacosctes radians*.^{*}

POLYSTICHUM VESTITUM. A very dark green stiff-looking fern with abundant brown scales clothing the stalk. *Azelina fortinuta*; *Pyrgotis pyramidioides*;^{*} *Capua platydan*;^{*} *Thylacosctes acridomima*.^{*}

PORTULACA. A genus of small low-spreading annuals with wedge-shaped leaves and yellow-red flowers. They are natives of Australia and America, but are naturalised in New Zealand. *Hypolimnas bolina*.

PSEUDOPANAX CRASSIFOLIUM (Lancewood, Horoecka). A small round-headed tree best known in its immature state when it has an upright flexible branchless stem with very long, narrow, hard, drooping leaves. *Parcetopa panacivagans*.

PERIDIUM AQUILINUM (Common "fern"; bracken, rauaruhe-rahuru). *Crambus tuhuatis*;^{*} *Pyroderces aurithina*.^{*}

PTERIS MACLENTA. A rather rare fern though occasionally found in great abundance in damp, stony ground in the bush. It is about 2 feet high, and is extremely delicate, with pale green flaccid glistening fronds deeply cut, and wiry stems. *Sestra flexata*.

QUERCUS ROBUR (The Oak). *Capua platydan*;^{*} *Hepialus virescens* (in stems).

RHIFOGONUM SCANDENS (Supplejack, Kareao, Pirita). A tall climber with long cable-like leafless stems. The leaves and clusters of greenish flowers are born only towards the ends of the branches. The berries are bright red and very conspicuous. *Sclidosema dejectaria*.

RHOPALOSTYLIS SAPIDA (The Niku Palm). *Izalia attactella* (in dead wood); *Doxophytis hydrocosma*;^{*} *Amphizystis hapsimacha*;^{*} *Eugennaca laquearia*.^{*}

RUBUS AUSTRALIS (Bush Lawyer, Tataramoa). A lofty climber covered with sharp recurved prickles, and bearing in early summer dense panicles of fragrant white or pink flowers. The fruit is red or orange. *Mcclancha oethistis*; *Chloroclystis semiabata* (on flowers); *Elvia glauca*; *Sclidosema dejectaria*; *Carposina adreptella*.

RUBUS CISOIDES (Small Lawyer). Two forms occur: (1.) A forest climber with very few pale coloured prickles on the leaves and none on the stem—yellowish flowers and narrow leaves. (2.) A leafless dense twiggy bush with many prickles found in open dry situations. Apparently flowerless. *Stathmopoda aposema*.^{*}

RUMEX OBTUSIFOLIUS (Common Dock). *Ctenopscustis obliquana*.

SALIX BABYLONICA (Weeping Willow). *Oeceticus omnivorus*; *Hepialus virescens* (in stems).

SALIX FRAGILIS (Crack Willow). *Oeceticus omnivorus*; *Hepialus virescens* (in stems).

SCHIEFLERIA DIGITATA (Pate, Patele). A very common, small tree with many erect branches. Its yellowish-green leaves are divided into seven to ten leaflets, finely toothed. The minute flowers are green and are borne in spreading clusters. *Alucita monospitalis*.

SENECIO BELLIDIOIDES. A fairly common mountain herb with rough radical leaves and a central flower stem 1-12 inches high surmounted by one or many yellow daisy-like flowers. *Melaeris crichrysa*.

SENECIO JACOBAEA (Ragwort, Ragweed). A herb two or three feet high often found in open fields. It is like a very large groundsel with bright yellow daisy-like flowers collected into flattish clusters. *Nyctemera annulata*.

SENECIO MIKANIODES (called by settlers French Ivy). A common climbing plant having a superficial resemblance to ivy, but with much brighter green leaves, and masses of small yellow flowers. *Nyctemera annulata*.

SENECIO VULGARIS (Groundsel). A common garden weed. *Nyctemera annulata*.

SIDA RHOMBIFOLIA (Paddy's lucerne). A rather tall Australian herb belonging to the Mallow family. It has toothed leaves and small yellow flowers on slender flower stalks. *Hypolimnas bolina*.

SOLANUM AVICULARE (Poro-poro, Kohoho, or Potato Plant). A shrub, with very dark green, pointed leaves, purple underneath, and bright purple flowers resembling those of the potato. The berries are bright orange. *Plusia chalcites*; *Sclidosema dejectaria*; *Scotiodes cordalis* (in berries only).

SOPHORA TETRAPTERA (Kowhai, N.Z. Laburnum). A small and very graceful tree with wattle-like foliage and masses of golden flowers resembling very large half-opened broom flowers. The pods are long and shrivelled and the shape of the seeds within them can be easily seen. *Mecyna maoralis*; *Stathmopoda aposema*.^{*}

SUTTONIA AUSTRALIS (Mapau, Tipau, Matipou). A small ornamental tree with wavy pale green leaves often spotted with red and dark red branches. It has small white flowers and round black berries. *Tortrix excessana*.

TYPIA ANGUSTIFOLIA (The Bulrush. Raupo). *Limnoccia phragmitella*; *Scieropclea typhicola*; *Stathmopoda phleggyra*.

TRIFOLIUM REPENS (Common White Clover). *Mecyna maoralis*.

URTICA FEROX ("Nettle Tree," Onga-onga). A small shrub with light green leaves, and very long thick spines which sting severely; a row of these spines is situated along the midrib of each leaf. It grows in open situations. *Vancssa goncrilla*; *V. itea*; *Mecyna marmarina*.

URTICA INCISA (Ground Nettle). An herbaceous plant found in shady places amongst ferns. The leaves are covered with spines, which give a very sharp sting when touched. *Vancssa goncrilla*; *V. itea*; *Graphiphora compta*; *Mecyna marmarina*.

USNEA BARBATA. A greyish-white, feathery-looking pendulous lichen growing on stems and trunks of trees. It is abundant in subalpine beech forests. *Platyptilia deprivalis*.^{*}

VERONICA (Koromiko). A genus of shrubs, found commonly on the margins of forests, and on hill-tops. The leaves are rather long, smooth, and dark green, and the flowers are mostly purplish-white, very small, and arranged in spiked clusters. They are very attractive to insects. *Heliothis armigera*; *Chloroclystis paralodes*; *C. dryas*; *C. lunata*; *C. furva*;^{*} *C. rubella*;^{*} *C. erratica*;^{*} *Epirrhantis hemipteraria*; *Mecyna diacalis*; *Platyptilia heliastis*;^{*} *Ctenopscustis obliquana*; *Pyrgotis consuetiens*.^{*}

VITEX LUCENS (Puriri, Kauere). A large, spreading tree with a massive trunk. It is common in the Auckland Province. The leaves are large, dark green, crinkled and glossy. The flowers are dull pink about one inch long. The berries closely resemble cherries. *Hepialus virescens* (in stems).

VITIS VINIFERA (The Grape-vine). *Dilephila cedrio*.

WEINMANNIA RACEMOSA (Tawhero, Kamahi, Flowering Birch). A fairly common, erect, rusty-looking tree, often growing in subalpine districts. It somewhat resembles a beech tree but the leaves are larger. The flowers superficially resemble those of the common koromiko (Veronica) and are very attractive to insects. The flower buds are dark red. *Tatosoma tipulata*; *Hepialus virescens* (in stems).

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<i>sericea</i>	47	<i>(Persectania)</i>		<i>thalophora</i>	319	<i>tuhualis</i>	168
<i>sericodes</i>	121	<i>sternopucha</i>	326	<i>Thallostoma</i>	343	<i>tuhualis</i>	168
<i>servana</i>	234	<i>Sterrhides</i>	132	<i>Thambotricha</i>	324	<i>tuhuala</i>	103
<i>scrutisana</i>	246	<i>stigmatica</i>	145	<i>Thamnosara</i>	273	<i>tungella</i>	315
<i>scrutaria</i>	107	<i>stigmatizans</i>	83	<i>theatralis</i>	238	<i>turbida</i>	65
SESHIDAE, <i>see</i>		<i>stilbella</i>	336	<i>Thectophila</i>	302	<i>turbulenta</i>	47
AEGERIADAE	250	<i>stinaria</i>	122	<i>Theoxena</i>	133	<i>turbulentana</i>	234
<i>Sestra</i>	146	<i>stipata</i>	71	<i>thermochromata</i>	149	<i>tylogramma</i>	339
<i>sideraspis</i>	202	<i>Stomopteryx</i>	253	<i>thetodes</i>	276	<i>typhicola</i>	295
<i>sideritis</i>	249	<i>straminea</i>	248	<i>Thiotricha</i>	253	<i>typhlopa</i>	344
<i>siderodeta</i>	15, 262	<i>strangulata</i>	102	<i>tholodella</i>	276		
<i>siderota</i>	267	<i>strategica</i>	130	<i>thoracica</i>	76		
<i>signata</i>	363	<i>(Dasyuris)</i>		<i>thorybodes</i>	254	<i>umbra</i>	70
<i>Simaethis</i>	307	<i>strategica</i>	13, 44	<i>thranias</i>	261	<i>umbraculata</i>	363
<i>similata</i>	99	<i>(Metacrias)</i>		<i>thrinodes</i>	168	<i>umbrosa</i>	115
<i>similis</i>	367	<i>strophophora</i>	137	<i>Thylacoscetes</i>	300	<i>undosata</i>	105
<i>(Mnesarchaea)</i>		<i>stricta</i>	119	<i>thyraula</i>	255	<i>undulata</i>	114
<i>similis</i>	61	<i>strigosa</i>	170	<i>thyridias</i>	183	<i>unduligera</i>	97
<i>similis</i>	329	<i>strigosus</i>	170	THYRIDIDAE	206	<i>unica</i>	52
<i>(Orthenches)</i>		<i>strigulata</i>	353	<i>thymiaestes</i>	159	<i>unicolor</i>	214
<i>semilistata</i>	113	<i>strophaea</i>	170	<i>tigris</i>	229	<i>unilinea</i>	135
<i>simplex (Crambus)</i>	166	<i>stulta</i>	54	<i>tillyardi</i>	310	<i>unipuncta</i>	54
<i>simplex (Notoreas)</i>	126	<i>suavis</i>	142	<i>timaralis</i>	177	<i>urbana</i>	309
<i>simplicella</i>	253	<i>subchalybea</i>	80	<i>timarata</i>	99	<i>usitata</i>	142
<i>simulans</i>	134	<i>subditella</i>	260	<i>timora</i>	86	<i>ustaria</i>	135
<i>simulans</i>	97	<i>subdola</i>	227	TINAEGERIADAE	250	<i>ustimacula</i>	189
<i>sinuosa</i>	152	<i>subductata</i>	112	<i>Tinea</i>	345	<i>ustistriga</i>	68
<i>siraea</i>	236	<i>subfasciata</i>	15, 206	TINEIDAE	251	<i>Utheihsa</i>	44
<i>sirenica</i>	341	<i>subflava</i>	121	<i>Tineides</i>	338	<i>utucella</i>	275
<i>siria</i>	98	<i>subitata</i>	89	TINEINA, <i>see</i>			
<i>siriana</i>	237	<i>subitus</i>	159	TINEIDAE	251		
<i>siriellus</i>	166	<i>sublitella</i>	273	<i>Tineola</i>	345	<i>vacua</i>	272
<i>siris</i>	98	<i>submarginalis</i>	192	<i>tipulata</i>	85	<i>vagata</i>	290
<i>siris</i>	131	<i>subobscurata</i>	115	<i>tipuliforme</i>	250	<i>vagella</i>	157
<i>sistens</i>	55	<i>subochraria</i>	102	<i>Titanomis</i>	351	<i>Vanessa</i>	34
<i>sisyra</i>	240	<i>subpavonella</i>	335	<i>topia</i>	87	<i>Vanicela</i>	298
<i>sisyrota</i>	351	<i>subpurpureata</i>	103	<i>torcuma</i>	278	<i>vapidus</i>	167
<i>Sitotroga</i>	259	<i>subrectaria</i>	102	<i>toriate</i>	88	<i>varia</i>	224
<i>skelloni</i>	299	<i>subtentaria</i>	106	<i>tornota</i>	222	<i>varians</i>	135
<i>skelloni</i>	65	<i>suffusa</i>	97	<i>torodes</i>	191	<i>variabilis</i>	148
<i>smynthistis</i>	74	<i>(Chloroclystis)</i>		<i>torogramma</i>	228	<i>(Azelnia)</i>	
<i>solanella</i>	254	<i>suffusa (Agrotis)</i>	48	<i>toroneura</i>	52	<i>variabilis</i>	272
<i>sollennis</i>	58	<i>sulcana</i>	53	<i>toroterna</i>	241	<i>(Leptocroca)</i>	
<i>somnulentella</i>	332	<i>sulpitata</i>	145	TORTRICIDAE	215	<i>variolaris</i>	362
<i>sophistes</i>	169	<i>suppressaria</i>	112	<i>Tortricides</i>	218	<i>varioliola</i>	83
<i>sophronellus</i>	169	<i>symbolaea</i>	295	<i>Tortrix</i>	226	<i>vates</i>	325
<i>sordida</i>	288	<i>Symmoea</i>	295	<i>tourmabou</i>	214	<i>veda</i>	47
<i>sordidatana</i>	223	<i>symmorpha</i>	295	<i>Trachybatra, see</i>		<i>velleda</i>	13, 33
<i>sparsa</i>	252	<i>synclinalis</i>	122	<i>Harmologa</i>	239	<i>venipunctata</i>	112
<i>spartodeta</i>	284	<i>Syntomactis</i>	303	<i>Trachypepla</i>	283	<i>ventosus</i>	159
<i>spatiosa</i>	229	<i>syntona</i>	229	<i>transaurea</i>	130	<i>Venusia</i>	104
<i>specifica</i>	55			<i>transcissalis</i>	167	<i>verriculata</i>	104
<i>spectans</i>	81	<i>taipana</i>	234	<i>transfixa</i>	221	<i>verrucosa</i>	152

	PAGE		PAGE		PAGE		PAGE
<i>versuta</i>	287	<i>viridis</i>	65	<i>xanthomicta</i>	262	<i>zatrophana</i>	238
<i>verticillata</i>	79	<i>vitiosa</i>	73	<i>Xanthorhoe</i>	109	<i>zelaea</i>	224
<i>vestita</i>	266	<i>vittiosa</i>	73	<i>Xeroscopa, sec</i>		<i>Zelleria</i>	320
<i>vetustana</i>	219	<i>vittellus</i>	167	<i>Scoparia</i>	182	<i>zelota</i>	21, 316
<i>vezata</i>	66	<i>voluta</i>	242	<i>xestobela</i>	311	<i>zestodes</i>	232
<i>vibratrix</i>	307	<i>vulcanica</i>	127	<i>xylinana</i>	222	<i>ziczag</i>	148
<i>vicariana</i>	228	<i>vulgaris</i>	168	<i>Xyloryctides</i>	295	<i>zomcuta</i>	307
<i>vigens</i>	211	<i>vulpecula</i>	195	<i>xysmatias</i>	187	<i>zonodoxa</i>	368
<i>vigens</i>	62			<i>xystrota</i>	249	<i>zopherana</i>	246
<i>vilis</i>	239	<i>scatti</i>	319			<i>zophochalca</i>	253
<i>villosa</i>	123			<i>Ypsilon</i>	48	<i>zophochlaena</i>	186
<i>vinaria</i>	285	<i>xanthaspis</i>	106	<i>ypsilonaria</i>	110	<i>zophodactyla</i>	211
<i>vinitincta</i>	329	<i>xanthialis</i>	179			<i>zophoessa</i>	290
<i>virescens</i>	16, 357	<i>xanthodesma</i>	261	<i>Zapyrastra</i>	302	<i>zopyra</i>	126
<i>virescens</i>	55	<i>xanthogramma</i>	65	<i>zatricha</i>	92	<i>zorionella</i>	321
<i>virgata</i>	330	<i>xanthogrammus</i>	170			<i>zygiana</i>	222

PLATES AND EXPLANATIONS.

PLATE A.

STRUCTURAL.

FIG.

1. Neuration of fore-wing of *Delogenes limodoxa*. (Imago, Plate XLIV., fig. 12.)
2. Neuration of hind-wing of ditto.
3. Head of ditto.
4. Neuration of fore-wing of *Monopis ethelella*. (Imago, Plate XXXIX., fig. 1.)
5. Neuration of hind-wing of ditto.
6. Head of ditto.
7. Neuration of fore-wing of *Circozena ditrocha*. (Imago, Plate XXVIII., fig. 19.)
8. Neuration of hind-wing of ditto.
9. Head of ditto.
10. Neuration of fore-wing of *Mnesarchaea hamadelpha*. (Imago, Plate XXXIX., fig. 24.)
11. Neuration of hind-wing of ditto.
12. Neuration of fore-wing of *Rhyacophila munda* (Trichoptera.)
13. Neuration of hind-wing of ditto.
14. Neuration of fore-wing of *Sabalinca incongruella*. (Imago, Plate XXXIX., fig. 19.)
15. Neuration of hind-wing of ditto.
16. Head of ditto.
17. Neuration of fore-wing of *Isonomeutis amautropa*. (Imago, Plate XLV., fig. 22.)
18. Neuration of hind-wing of ditto.
19. Head of ditto.
20. Neuration of fore-wing of *Oeceticus omnivorus*. (Imago, Plate XLIV., fig. 14.)
21. Neuration of hind-wing of ditto.
22. Diagram of fore-wing of Lepidopterous insect showing nomenclature used in describing the markings.

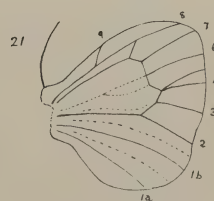
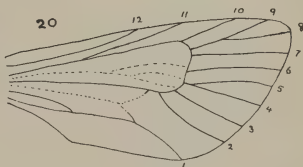
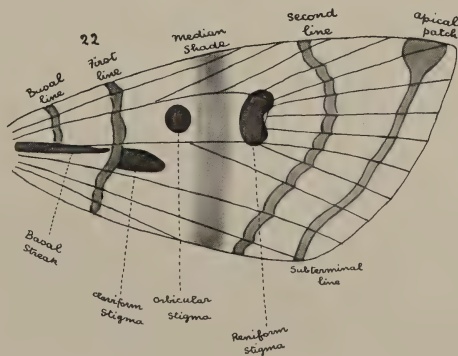
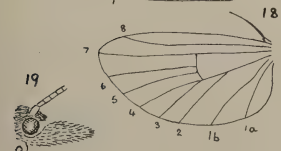
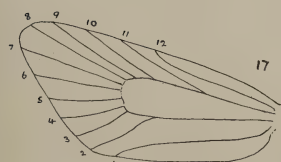
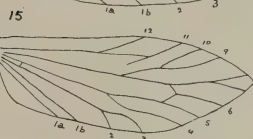
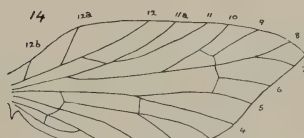
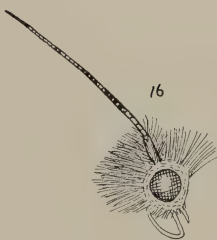
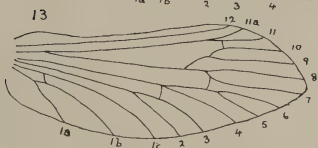
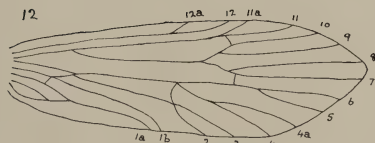
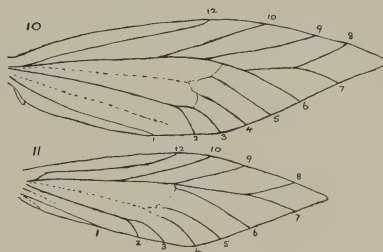
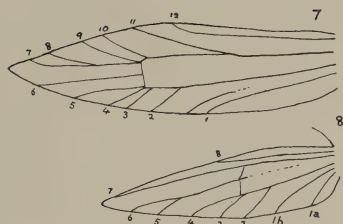
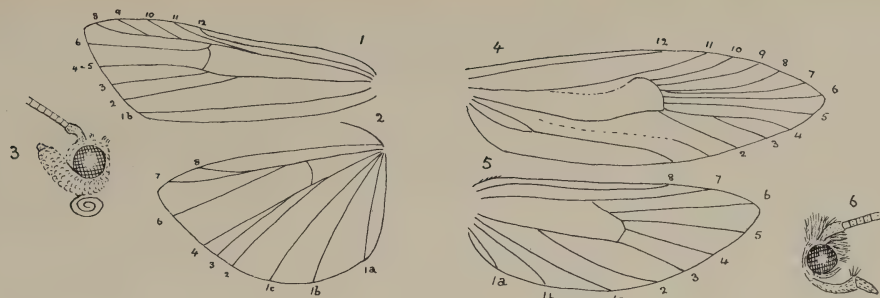






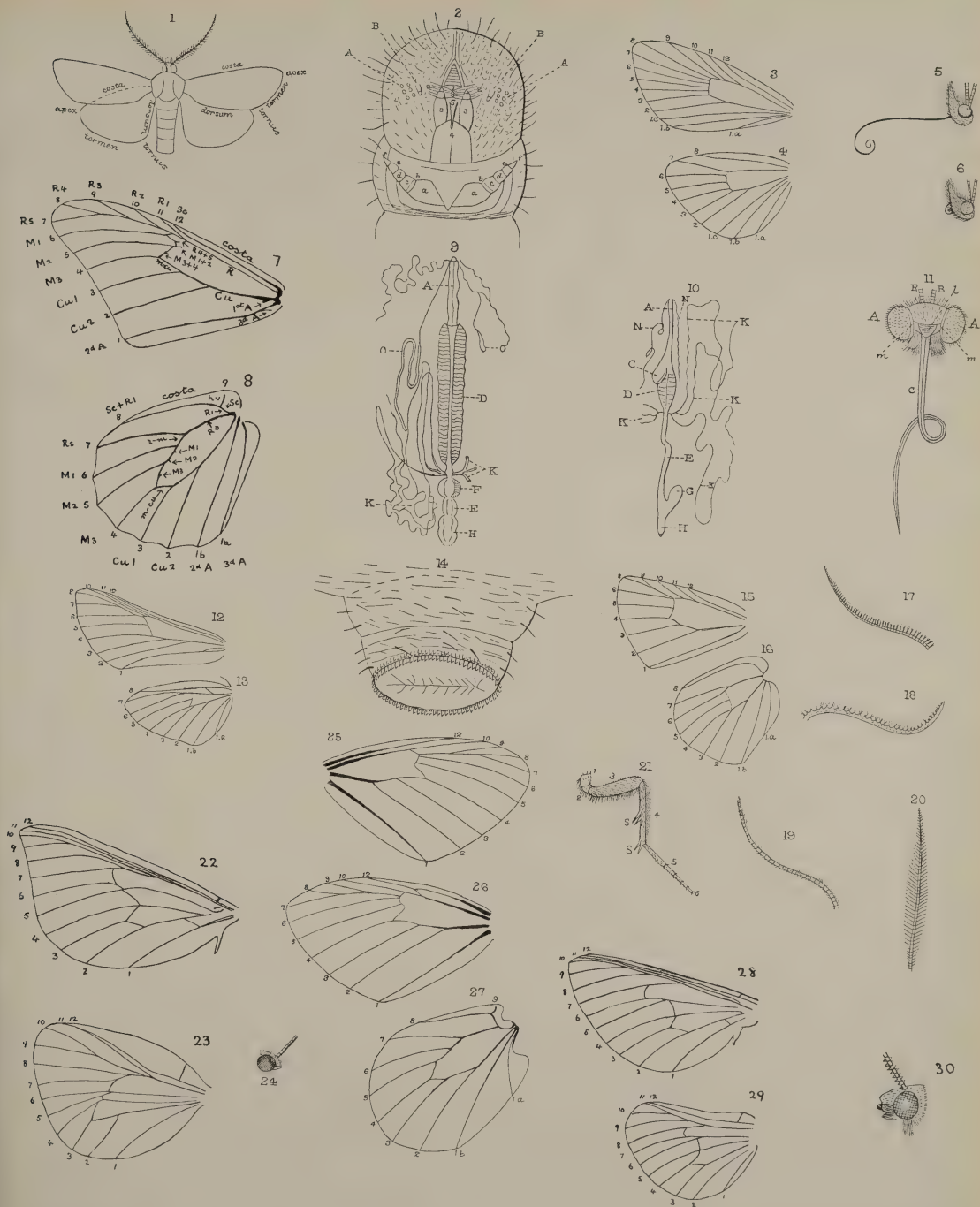
PLATE B.

STRUCTURAL.

FIG.

1. Outline of a Lepidopterous insect showing the terms employed in describing the various margins and angles of the fore- and hind-wings.
2. View of the under side of the head and first segment of the larva of a Lepidopterous insect. AA, eyes; BB, antennae; 1, labrum; 22, mandibles; 33, maxillae; 4, labium; 5, spinneret; a, coxa; b, trochanter; c, femur; d, tibia; e, tarsus; f, claw (highly magnified).
3. Assumed type of neuration of fore-wing of a Lepidopterous insect. (After Meyrick).
4. Ditto of hind-wing. (After Meyrick.)
5. Side view of the head of *Vanessa gonerilla* with proboscis extended. (Imago, Plate IV., fig. 9.)
6. Ditto with proboscis coiled up. (In both these figures only the basal portions of the antennae are shown.)
- *7. Neuration of fore-wing of *Danaida plexippus*, showing British and Comstock-Needham notation of veins. (Imago, Plate IV., fig. 10.)
8. Ditto of hind-wing.
9. Digestive system of a Lepidopterous larva. A, oesophagus; D, ventriculus; F, clavate intestine; E, ilium; H, colon; K, malpighian tubes; O, spinning vessels. (After Suckow.)
10. Ditto of perfect insect. N, salivary vessels; C, sucking stomach; G, caecum. The rest as before. (After Herold.)
11. Front view of the head of *Vanessa gonerilla* with the labial palpi removed showing the organs of the mouth. AA, eyes; BB, antennae (basal portion); l, labrum; mm, mandibles; C, proboscis formed of elongated maxillae (highly magnified.)
12. Neuration of fore-wing of *Sphingidae*. (*Deilephila*; after Meyrick.)
13. Ditto hind-wing. (After Meyrick.)
14. Proleg of caterpillar highly magnified.
15. Neuration of fore-wing of *Chrysophanus salustius*. (Imago, Plate V., fig. 27.)
16. Ditto of hind-wing.
17. Fasciculate-ciliated antenna of *Chloroclystis sandycias*. (Imago, Plate XI., fig. 13.)
18. Serrate antenna of *Persectania composita*. (Imago, Plate VII., fig. 27.)
19. Pubescent antenna of *Epirrhantis alectoraria*. (Imago, Plate XVI., fig. 5.)
20. Bi-pectinated antenna of *Nyctemera annulata*. (Imago, Plate VI., fig. 3.)
21. Leg of *Agrotis ypsilon*. (Imago, Plate VI., fig. 21.) 1, coxa; 2, trochanter; 3, femur; 4, tibia; 5, tarsus; 6, claw; SS, spurs. (All these are highly magnified.)
22. Neuration of fore-wing of *Heptalus virescens* ♂. (Imago, Plate XLII., fig. 13.)
23. Ditto of hind-wing.
24. Head of ditto.
25. Neuration of fore-wing of *Erebia plato*. (Imago, Plate V., fig. 13.) Vein 11 absent.
26. Ditto, veins 11 and 12 concurrent.
27. Ditto of hind-wing.
28. Neuration of fore-wing of *Porina signata* ♂. (Imago, Plate XLIII., fig. 2.)
29. Ditto of hind-wing.
30. Head of ditto.

*In this figure vein 10 is wrongly shown as stalked.





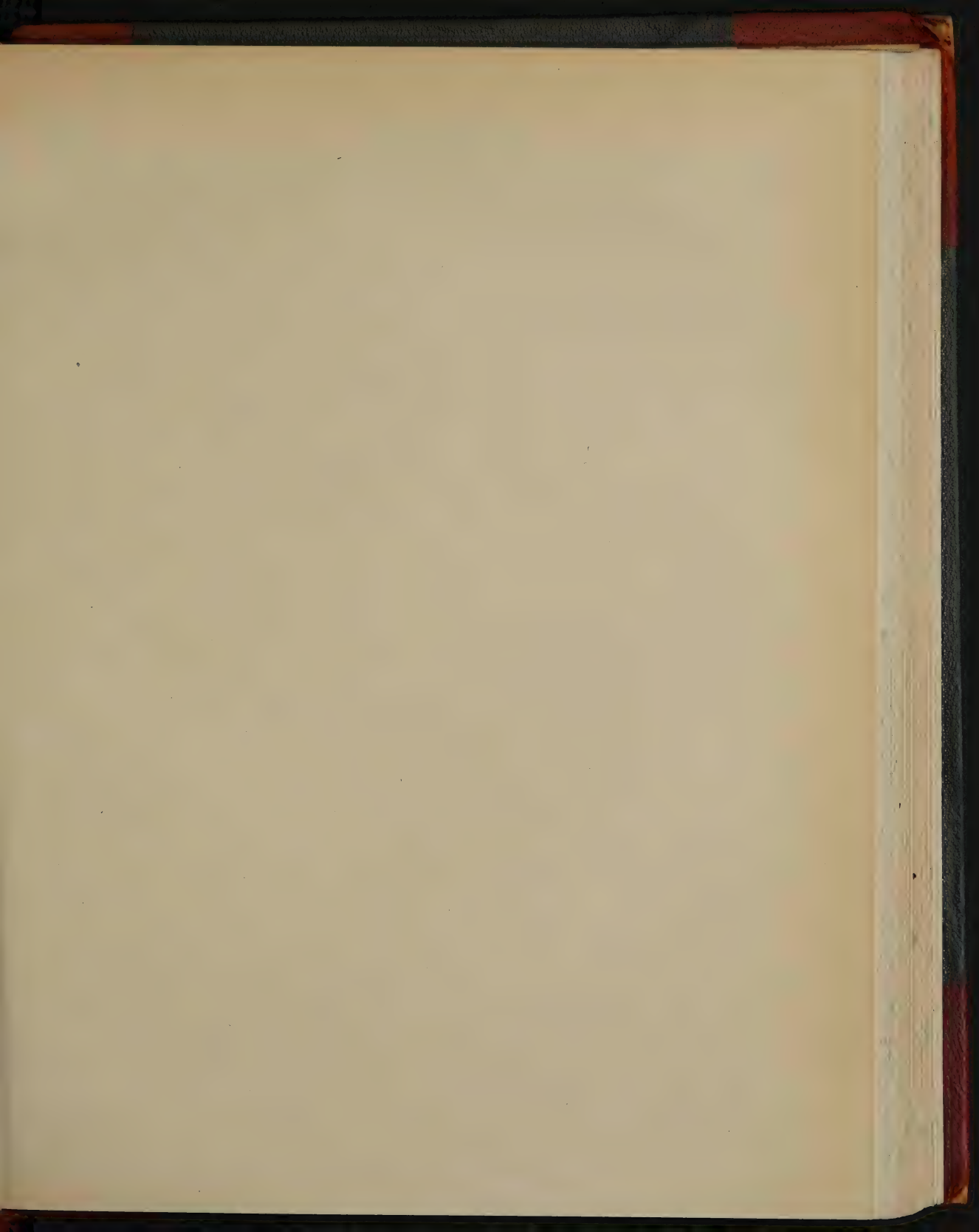


PLATE C.

FIG.

ARCTIADAE. (Structural.)

1. Neuration of fore-wing of *Melacrias erichrysa*. (Imago, Plate VI., fig. 12.)
2. Neuration of hind-wing of ditto.
3. Head of *Nyctemera annulata*. (Imago, Plate VI., fig. 3.)
4. Neuration of fore-wing of ditto.
5. Neuration of hind-wing of ditto.

NOCTUIDAE.

6. Neuration of fore-wing of *Melanchra mutans*. (Imago, Plate VIII., figs. 13, 14.)
7. Neuration of hind-wing of ditto.
8. Head of male of *Physetica caerulea*. (Imago, Plate VII., figs. 20-22.)
9. Neuration of fore-wing of *Erana graminosa*. (Imago, Plate VII., figs. 30, 31.)
10. Neuration of hind-wing of ditto.
11. Head of *Aletia nullifera*. (Imago, Plate VI., fig. 14.)
12. Head of *Dasypodia sclenophora*. (Imago, Plate X., fig. 13.)
14. Neuration of fore-wing of *Plusia chalcites*. (Imago, Plate X., fig. 5.)
15. Neuration of hind-wing of ditto.
16. Neuration of fore-wing of *Rhapa scotosialis*. (Imago, Plate X., figs. 6-7.)
17. Neuration of hind-wing of ditto.
18. Head of ditto.

GEOMETRIDAE.

13. Head of *Venusia verriculata* male. (Imago, Plate XIII., figs. 9-10.)
19. Neuration of fore-wing of *Chloroclystis bilineolata*. (Imago, Plate XI., fig. 8.)
20. Neuration of hind-wing of ditto.
21. Neuration of fore-wing of *Tatosoma tipulata*. (Imago, Plate XII., figs. 8-9.)
22. Neuration of hind-wing of male.
23. Neuration of hind-wing of female.
24. Head of ditto.
25. Neuration of fore-wing of *Venusia verriculata*. (Imago, Plate XIII., figs. 9-10.)
26. Neuration of hind-wing of ditto.
27. Neuration of fore-wing of *Paradetis porphyrias*. (Imago, Plate XI., figs. 37-38.)
28. Neuration of hind-wing of male.
30. Neuration of fore-wing of *Asthenia pulchraria*. (Imago, Plate XII., figs. 29-30.)
31. Neuration of hind-wing of ditto.
32. Head of *Hydriomena deltoidea*. (Imago, Plate XII., figs. 24-28.)
33. Neuration of fore-wing of ditto.
34. Neuration of hind-wing of ditto.
35. Neuration of fore-wing of *Asaphodes megaspilata*. (Imago, Plate XIII., figs. 14-16.)
36. Neuration of hind-wing of ditto.
37. Neuration of fore-wing of *Xanthorhoe clarata*. (Imago, Plate XIV., figs. 26-27.)
38. Neuration of hind-wing of ditto.
39. Neuration of fore-wing of *Lythria chysopeda*. (Imago, Plate XV., figs. 2-3.)
40. Neuration of hind-wing of ditto.
42. Neuration of fore-wing of *Dasyuris partheniata* (hind-wings as in *Xanthorhoe*). (Imago, Plate XV., fig. 47.)
43. Neuration of fore-wing of *Notoreas brephos* (hind-wings also as in *Xanthorhoe*). (Imago, Plate XV., figs. 32-33.)
44. Neuration of fore-wing of *Dichromodes sphaeriata*. (Imago, Plate XV., fig. 12.)
45. Neuration of hind-wing of ditto.
46. Neuration of fore-wing of *Epirrhanthis alceatoraria*. (Imago, Plate XVI., figs. 5-8.)
47. Neuration of hind-wing of ditto.
48. Head of ditto.
49. Neuration of fore-wing of *Leptomeris rubraria*. (Imago, Plate XV., fig. 8.)
50. Neuration of hind-wing of ditto.
51. Neuration of fore-wing of *Selidosema pelurgata*. (Imago, Plate XVI., figs. 14-17.)
52. Neuration of hind-wing of ditto.
53. Neuration of fore-wing of *Sestra flexata* (hind-wing as in *Selidosema*). (Imago, Plate XVII., figs. 30-33.)
54. Neuration of fore-wing of *Adeixis griseata*. (Imago, Plate XV., fig. 37.)
55. Neuration of hind-wing of ditto.
56. Neuration of fore-wing of *Declana floccosa*. (Imago, Plate XVIII., figs. 23-34.)
57. Neuration of hind-wing of ditto.
58. Head of ditto.
59. Neuration of fore-wing of *Selidosema productata*. (Imago, Plate XVI., figs. 9-11.)
60. Neuration of hind-wing of ditto.
61. Neuration of fore-wing of *Gargaphia muriferata*. (Imago, Plate XVII., figs. 34-36.)
62. Neuration of hind-wing of ditto.
63. Neuration of fore-wing of *Azelina nelsonaria*. (Imago, Plate XVIII., figs. 7-8.)
64. Neuration of hind-wing of ditto.





PLATE D.

PYRALIDAE. (Structural.)

- FIG.
1. Neurulation of fore-wing of *Sporophyla oenospira*. (Imago, Plate XIX., fig. 1.)
 2. Neurulation of hind-wing of ditto.
 3. Head of ditto.
 4. Neurulation of fore-wing of *Homocosoma vagella*. (Imago, Plate XX., fig. 11.)
 5. Neurulation of hind-wing of ditto.
 6. Head of ditto.
 7. Neurulation of fore-wing of *Protyparcha scaphodes*. (Imago, Plate XX., fig. 40.)
 8. Neurulation of hind-wing of ditto.
 9. Head of ditto.
 10. Antenna of ditto.
 11. Neurulation of fore-wing of *Crambus vittellus*. (Imago, Plate XX., figs. 2-4.)
 12. Neurulation of hind-wing of ditto.
 13. Head of ditto.
 14. Neurulation of fore-wing of *Argyria pentadactyla*. (Imago, Plate XX., fig. 48.)
 15. Neurulation of hind-wing of ditto.
 16. Head of ditto.
 17. Neurulation of fore-wing of *Diptychophora metallifera*. (Imago, Plate XIX., figs. 32-33.)
 18. Neurulation of hind-wing of ditto.
 19. Neurulation of fore-wing of *Gadira acerella*. (Imago, Plate XXII., fig. 29.)
 20. Neurulation of hind-wing of ditto.
 21. Head of ditto.
 22. Neurulation of fore-wing of *Tauroscopa glaucophanes* ♂. (Imago, Plate XX., figs. 45-46.)
 23. Neurulation of hind-wing of ditto.
 24. Head of ditto.
 25. Neurulation of fore-wing of *Nymphula nilens*. (Imago, Plate XIX., fig. 22.)
 26. Neurulation of hind-wing of ditto.
 27. Head of ditto.
 28. Neurulation of fore-wing of *Musotima nitidalis*. (Imago, Plate XIX., fig. 18.)
 29. Neurulation of hind-wing of ditto.
 30. Head of ditto.
 31. Neurulation of fore-wing of *Meegyna flavidalis*. (Imago, Plate XXI., figs. 27-28.)
 32. Neurulation of hind-wing of ditto.
 33. Head of ditto.
 34. Neurulation of fore-wing of *Scoparia cyanicuta*. (Imago, Plate XXI., fig. 54.)
 35. Neurulation of hind-wing of ditto.
 36. Head of ditto.
 37. Neurulation of fore-wing of *Protermia philocapna*. (Imago, Plate XX., fig. 42.)
 38. Neurulation of hind-wing of ditto.
 39. Head of ditto.
 40. Neurulation of fore-wing of *Nesarcha hybrealis*. (Imago, Plate XXI., figs. 30, 31.)
 41. Neurulation of hind-wing of ditto.
 42. Head of ditto.
 43. Head of *Heliothela crebopis*. (Imago, Plate XIX., fig. 29.)
 44. Neurulation of fore-wing of *Diascemia grammalis*. (Imago, Plate XIX., fig. 26.)
 45. Neurulation of hind-wing of ditto.
 46. Head of ditto.
 47. Head of *Clepsicosma iridia*. (Imago, Plate XXIV., fig. 22.)
 48. Head of *Secliodos cordalis*. (Imago, Plate XX., fig. 47.)
 49. Head of *Proterocca comastis*. (Imago, Plate XIX., fig. 25.)
 50. Neurulation of fore-wing of *Diploscustis perieralis*. (Imago, Plate XXII., fig. 44.)
 51. Neurulation of hind-wing of ditto.
 52. Head of ditto.



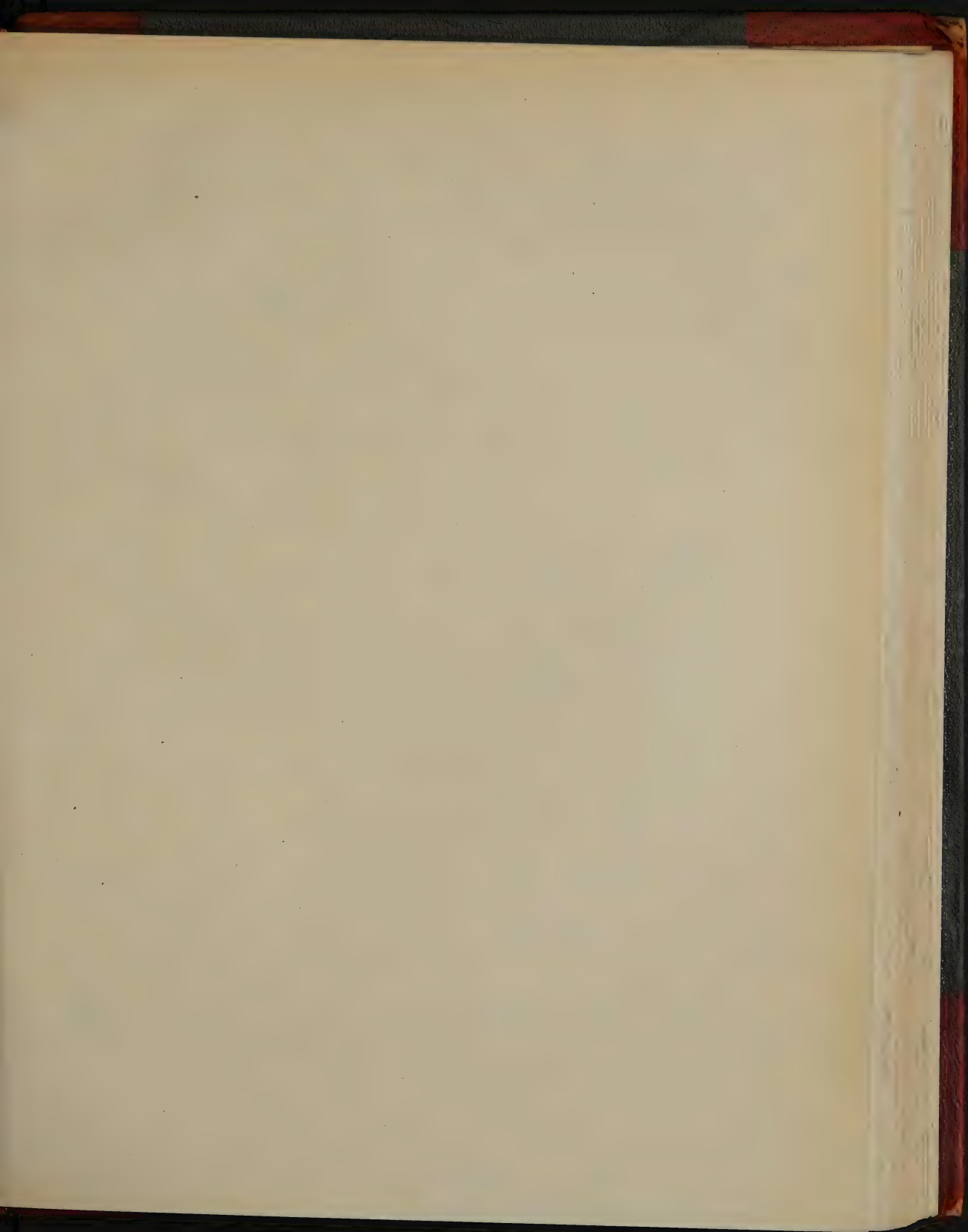


PLATE E.

THYRIDIDAE. (Structural).

FIG.

1. Neurulation of fore-wing of *Morova subfasciata*. (Imago, Plate XXIV., figs. 25-26.)
2. Neurulation of hind-wing of ditto.
3. Head of ditto.

PTEROPHORIDAE.

4. Neurulation of fore-wing of *Alucita monospilalis*. (Imago, Plate XXIII., figs. 5-6.)
5. Neurulation of hind-wing of ditto.
6. Head of ditto.
7. Neurulation of fore-wing of *Platyptilia falcatalis*. (Imago, Plate XXIII., figs. 7-8.)
8. Neurulation of hind-wing of ditto.
9. Head of ditto.

TORTRICIDAE.

10. Neurulation of fore-wing of *Carposina eriphylla*. (Imago, Plate XXIV., fig. 52.)
11. Neurulation of hind-wing of ditto.
12. Head of ditto.
13. Neurulation of fore-wing of *Pyrgotis pyramidius*. (Imago, Plate XXIV., fig. 12.)
14. Neurulation of hind-wing of ditto.
15. Head of ditto.
16. Neurulation of fore-wing of *Proselena niphostrota*. (Imago, Plate XXII., fig. 14.)
17. Neurulation of hind-wing of ditto.
18. Head of ditto.
19. Neurulation of fore-wing of *Capua semiferana*. (Imago, Plate XXVI., figs. 5-7.)
20. Neurulation of hind-wing of ditto.
21. Head of ditto.
22. Neurulation of fore-wing of *Catamacta gavisana*. (Imago, Plate XXII., figs. 34-35.)
23. Neurulation of hind-wing of ditto.
24. Head of ditto.
25. Neurulation of fore-wing of *Eurythecta zelaca*. (Imago, Plate XXVI., fig. 10.)
26. Neurulation of hind-wing of ditto.
27. Head of ditto.
28. Neurulation of fore-wing of *Ascerodes prochlora*. (Imago, Plate XXIV., fig. 38.)
29. Neurulation of hind-wing of ditto.
30. Head of ditto.
31. Neurulation of fore-wing of *Tortrix leucaniana*. (Imago, Plate XXVI., fig. 29.)
32. Neurulation of hind-wing of ditto.
33. Head of ditto.
34. Neurulation of fore-wing of *Epichorista emphanes*. (Imago, Plate XXVI., figs. 30-31.)
35. Neurulation of hind-wing of ditto.
36. Head of ditto.
37. Neurulation of fore-wing of *Epalziphora axenana*, veins 7 and 8 separate. (Imago, Plate XXV., figs. 44-53.)
38. Ditto with veins 7 and 8 stalked.
39. Neurulation of hind-wing of *Epalziphora axenana*.
40. Head of ditto.





PLATE F.

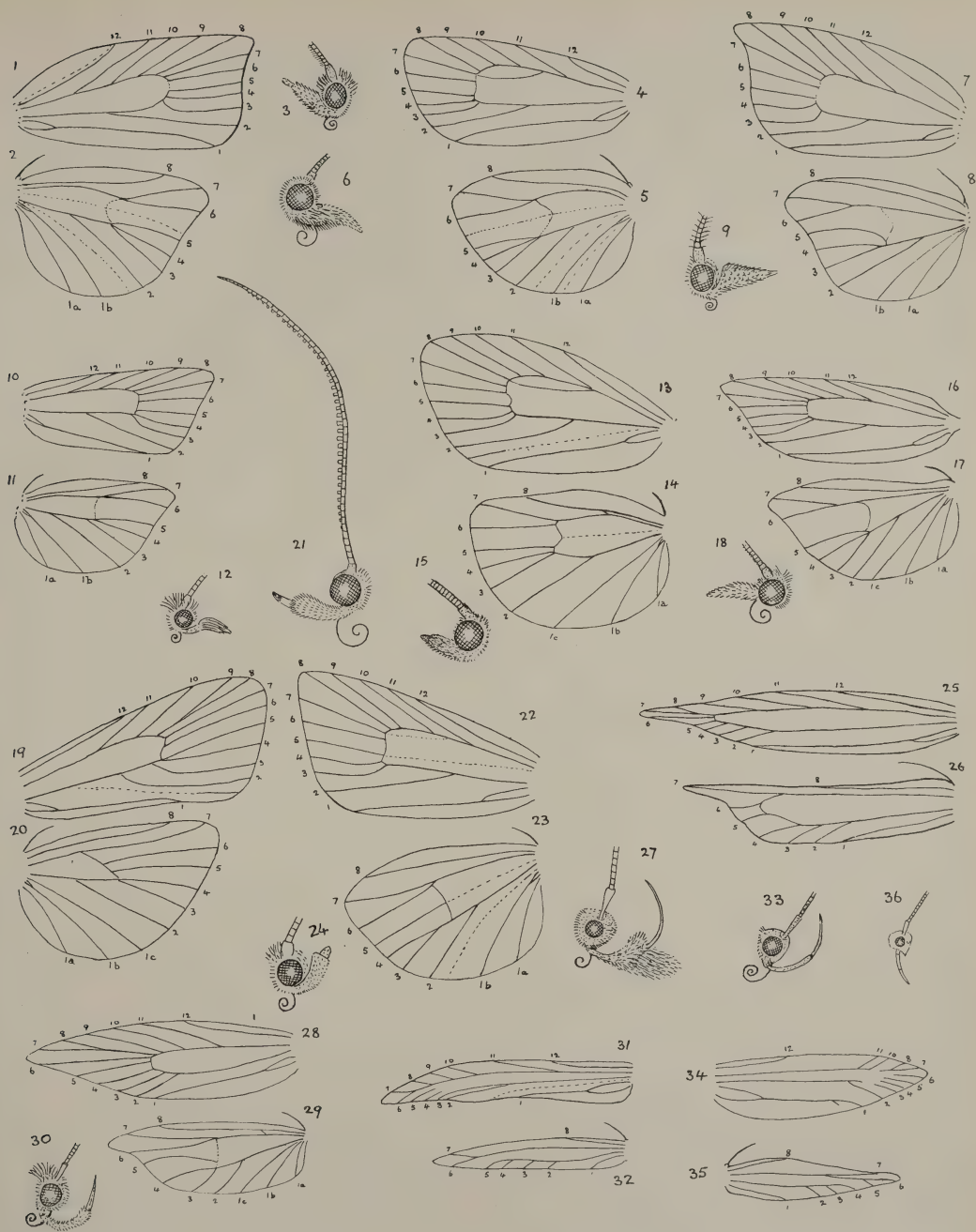
TORTRICIDAE. (Structural).

FIG.

1. Neuration of fore-wing of *Ctenopseustis obliquana*. (Imago, Plate XXV., figs. 3-10.)
2. Neuration of hind-wing of ditto.
3. Head of ditto.
4. Neuration of fore-wing of *Gelophaula siraca*. (Imago, Plate XXV., figs. 13-14.)
5. Neuration of hind-wing of ditto.
6. Head of ditto.
7. Neuration of fore-wing of *Cnephasia incessana*. (Imago, Plate XXV., fig. 19.)
8. Neuration of hind-wing of ditto.
9. Head of ditto.
10. Neuration of fore-wing of *Spilonota chaophila*. (Imago, Plate XXVI., figs. 35-36.)
11. Neuration of hind-wing of ditto.
12. Head of ditto.
13. Neuration of fore-wing of *Eucosma querula*. (Imago, Plate XXV., figs. 36-37.)
14. Neuration of hind-wing of ditto.
15. Head of ditto.
16. Neuration of fore-wing of *Bactra noteraula*. (Imago, Plate XXVI., fig. 9.)
17. Neuration of hind-wing of ditto.
18. Head of ditto.
22. Neuration of fore-wing of *Laspeyresia pomonella*. (Imago, Plate XXV., fig. 38.)
23. Neuration of hind-wing of ditto.
24. Head of ditto.

TINEIDAE.

19. Neuration of fore-wing of *Phycomorpha metachrysa*. (Imago, Plate XXVI., fig. 43.)
20. Neuration of hind-wing of ditto.
21. Head and antenna of ditto.
25. Neuration of fore-wing of *Megacraspedus calamogona*. (Imago, Plate XXVII., figs. 12-13.)
26. Neuration of hind-wing of ditto.
27. Head of ditto.
28. Neuration of fore-wing of *Gelechia monophragma*. (Imago, Plate XXVIII., figs. 4-5.)
29. Neuration of hind-wing of ditto.
30. Head of ditto.
31. Neuration of fore-wing of *Pyroderces apparitella*. (Imago, Plate XVIII., fig. 22.)
32. Neuration of hind-wing of ditto.
33. Head of ditto.
34. Neuration of fore-wing of *Zapyrastra calliphana*. (Imago, Plate XXVIII., fig. 20.)
35. Neuration of hind-wing of ditto.
36. Head of ditto.



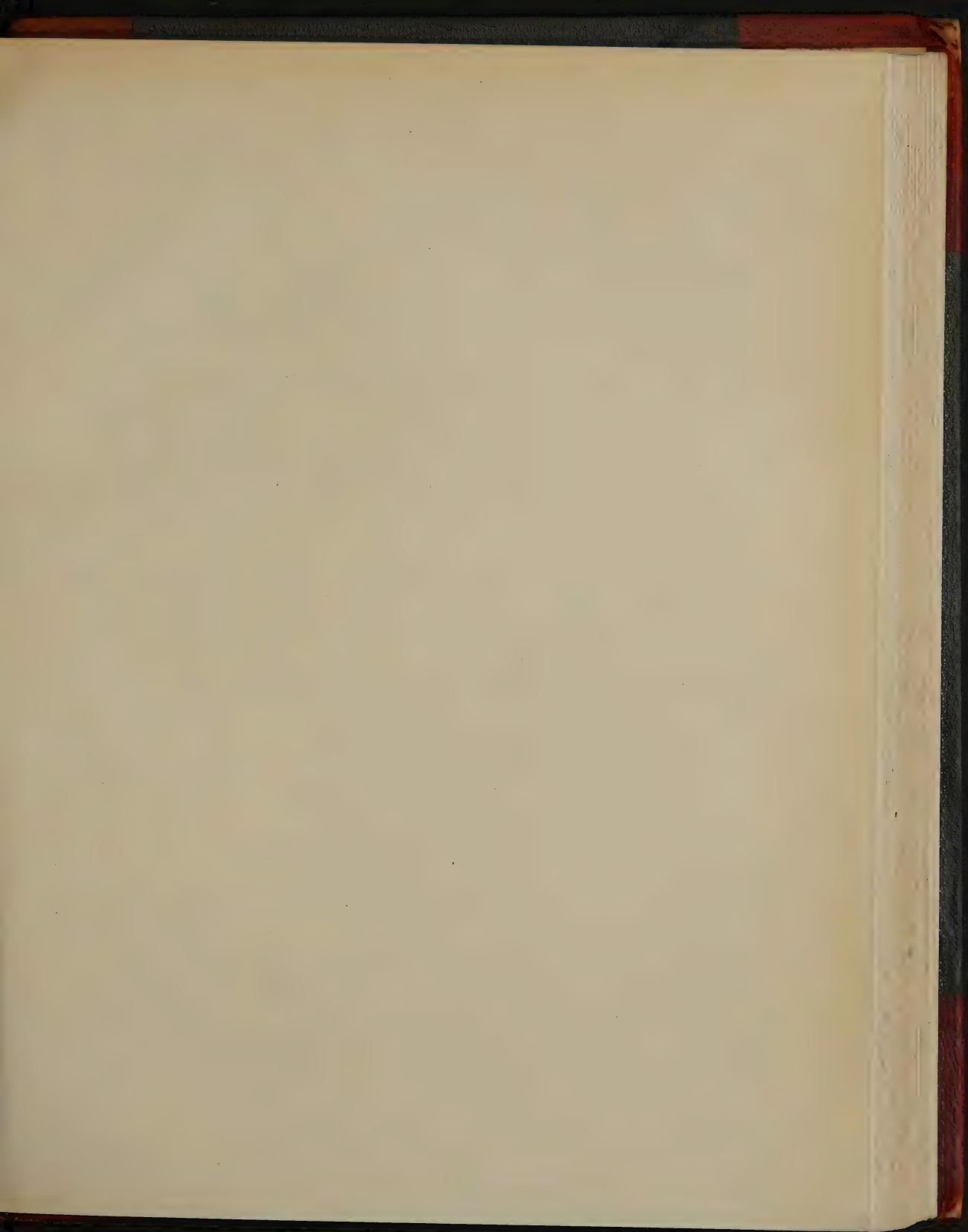


PLATE G.

TINEIDAE. (Structural).

FIG.

1. Neuration of fore-wing of *Elachista archaenoma*. (Imago, Plate XXVIII., figs. 9-10.)
2. Neuration of hind-wing of ditto.
3. Head of ditto.
4. Neuration of fore-wing of *Endrosis lacteella*. (Imago, Plate XVIII., fig. 12.)
5. Neuration of hind-wing of ditto.
6. Head of ditto.
7. Neuration of fore-wing of *Borkhausenia armigerella*. (Imago, Plate XXIX., figs. 11-12.)
8. Neuration of hind-wing of ditto.
9. Head of ditto.
10. Neuration of fore-wing of *Thamnosara sublitella*. (Imago, Plate XXX., fig. 28.)
11. Neuration of hind-wing of ditto.
12. Head of ditto.
13. Neuration of fore-wing of *Chersadula ochrogastra*. (Imago, Plate XLIX., fig. 12.)
14. Neuration of hind-wing of ditto.
15. Head of ditto.
16. Neuration of fore-wing of *Gymnobalkra hystodes*. (Imago, Plate XXX., figs. 11-12.)
17. Neuration of hind-wing of ditto.
18. Head of ditto.
19. Neuration of fore-wing of *Trachypepla galazias*. (Imago, Plate XXXI., fig. 28.)
20. Neuration of hind-wing of ditto.
21. Head of ditto.
22. Neuration of fore-wing of *Irenicodes eurychora*. (Imago, Plate XLVI., fig. 10.)
23. Neuration of hind-wing of ditto.
- 23a. Head of ditto.
24. Head of *Atomotricha isogama*. (Imago, Plate XXV., fig. 40.)
25. Neuration of fore-wing of *Izatha peroneanella*. (Imago, Plate XXV., fig. 54.)
26. Neuration of hind-wing of ditto.
27. Head of ditto.
28. Head of *Lathicrossa leucocentra*. (Imago, Plate XXXII., fig. 5.)
29. Head of *Proteodes carnifex*. (Imago, Plate XXXII., figs. 23-25.)
30. Head of *Barca dinocosma*. (Imago, Plate XXXII., fig. 10.)
31. Neuration of fore-wing of *Cadmogenes literata*. (Imago, Plate XLIX., fig. 11.)
32. Neuration of hind-wing of ditto.
33. Head of ditto.
34. Neuration of fore-wing of *Cryptolechia liochroa*. (Imago, Plate XXV., figs. 22-23.)
35. Neuration of hind-wing of ditto.
36. Head of ditto.
37. Neuration of fore-wing of *Agriophara coricopa*. (Imago, Plate XXV., figs. 11-12.)
38. Neuration of hind-wing of ditto.
39. Head of ditto.
40. Head of *Nymphostola galactina*. (Imago, Plate XXV., fig. 20.)





PLATE H.

TINEIDAE. (Structural).

FIG.

1. Neuration of fore-wing of *Schiffermuelleria orthophanes*. (Imago, Plate XXVIII., fig. 17.)
2. Neuration of hind-wing of ditto.
3. Head of ditto.
4. Neuration of fore-wing of *Eutorna caryochroa*. (Imago, Plate XXXII., fig. 9.)
5. Neuration of hind-wing of ditto.
6. Head of ditto.
7. Neuration of fore-wing of *Stathmopoda caminora*. (Imago, Plate XXXII., fig. 18.)
8. Neuration of hind-wing of ditto.
9. Head of ditto.
10. Neuration of fore-wing of *Thylascosceles acridomima*. (Imago, Plate XXXIII., figs. 4-5.)
11. Neuration of hind-wing of ditto.
12. Head of ditto.
13. Hind-leg of ditto.
14. Neuration of fore-wing of *Vanicela disjunctella*. (Imago, Plate XXXII., fig. 28.)
15. Neuration of hind-wing of ditto.
16. Head of ditto.
17. Base of antenna showing eye-cap from inside.
18. Neuration of fore-wing of *Simaethis combinatana*. (Imago, Plate XXXIII., fig. 29.)
19. Neuration of hind-wing of ditto.
20. Head of ditto.
21. Neuration of fore-wing of *Heliosibes atychioides*. (Imago, Plate XXXIII., fig. 23.)
22. Neuration of hind-wing of ditto.
23. Head of ditto.
24. Neuration of fore-wing of *Glyphipteryx erastis*. Imago, Plate XXXIV., fig. 20.)
25. Neuration of hind-wing of ditto.
26. Head of ditto.
27. Neuration of fore-wing of *Gracilaria linearis*. (Imago, Plate XXXV., fig. 6.)
28. Neuration of hind-wing of ditto.
29. Head of ditto.
30. Neuration of fore-wing of *Dolichernis chloroleuca*. (Imago, Plate XXXVI., fig. 2.)
31. Neuration of hind-wing of ditto.
32. Head of ditto.
33. Neuration of fore-wing of *Plutella maculipennis*. (Imago, Plate XXXVI., fig. 7.)
34. Neuration of hind-wing of ditto.
35. Head of ditto.
36. Neuration of fore-wing of *Protosynaema steropucha*. (Imago, Plate XXXIV., fig. 2.)
37. Head of hind-wing of ditto.
38. Head and antenna of ditto.
39. Neuration of fore-wing of *Batrachedra agaura*. (Imago, Plate XXXV., fig. 2.)
40. Neuration of hind-wing of ditto.
41. Head of ditto.
42. Neuration of fore-wing of *Orthenchus drosocalca*. (Imago, Plate XXXVI., fig. 4.)
43. Neuration of hind-wing of ditto.
44. Head of ditto.





PLATE K.

TINEIDAE. (Structural).

FIG.

1. Neuration of fore-wing of *Zelleria copidota*. (Imago, Plate XXXV., fig. 11.)
2. Neuration of hind-wing of ditto.
3. Head of ditto.
4. Neuration of fore-wing of *Erechthias externella*. (Imago, Plate XXXVI., fig. 13.)
5. Neuration of hind-wing of ditto.
6. Head of ditto.
7. Neuration of fore-wing of *Hectacma chasmatis*. (Imago, Plate XXXVI., fig. 17.)
8. Neuration of hind-wing of ditto.
9. Head of ditto.
10. Neuration of fore-wing of *Amphixystis hapsimacha*. (Imago, Plate XXXVI., figs. 24-25.)
11. Neuration of hind-wing of ditto.
12. Head of ditto.
13. Neuration of fore-wing of *Endopthora omogramma*. (Imago, Plate XXXVI., fig. 23.)
14. Neuration of hind-wing of ditto.
15. Head of ditto.
16. Neuration of fore-wing of *Sagephora phortegella*. (Imago, Plate XXXVII., figs. 20-21.)
17. Neuration of hind-wing of ditto.
18. Head of ditto.
19. Neuration of fore-wing of *Archyala terranca*. (Imago, Plate XXXVII., fig. 5.)
20. Neuration of hind-wing of ditto.
21. Head of ditto.
22. Neuration of fore-wing of *Eschatotypa derogatella*. (Imago, Plate XXXVII., fig. 1.)
23. Neuration of hind-wing of ditto.
24. Head of ditto.
25. Neuration of fore-wing of *Dryadaula myrrhina*. (Imago, Plate XXXVII., fig. 19.)
26. Neuration of hind-wing of ditto.
27. Head of ditto.
28. Neuration of fore-wing of *Scoriodyta conisalia*. (Imago, Plate XXXVII., fig. 11.)
29. Neuration of hind-wing of ditto.
30. Head of ditto.
31. Neuration of fore-wing of *Lysiphragma epizyla*. (Imago, Plate XXXIX., fig. 10.)
32. Neuration of hind-wing of ditto.
33. Head of ditto.
34. Neuration of fore-wing of *Mallobathra homalopa*. (Imago, Plate XXXIX., fig. 12.)
35. Neuration of hind-wing of ditto.
36. Head of ditto.



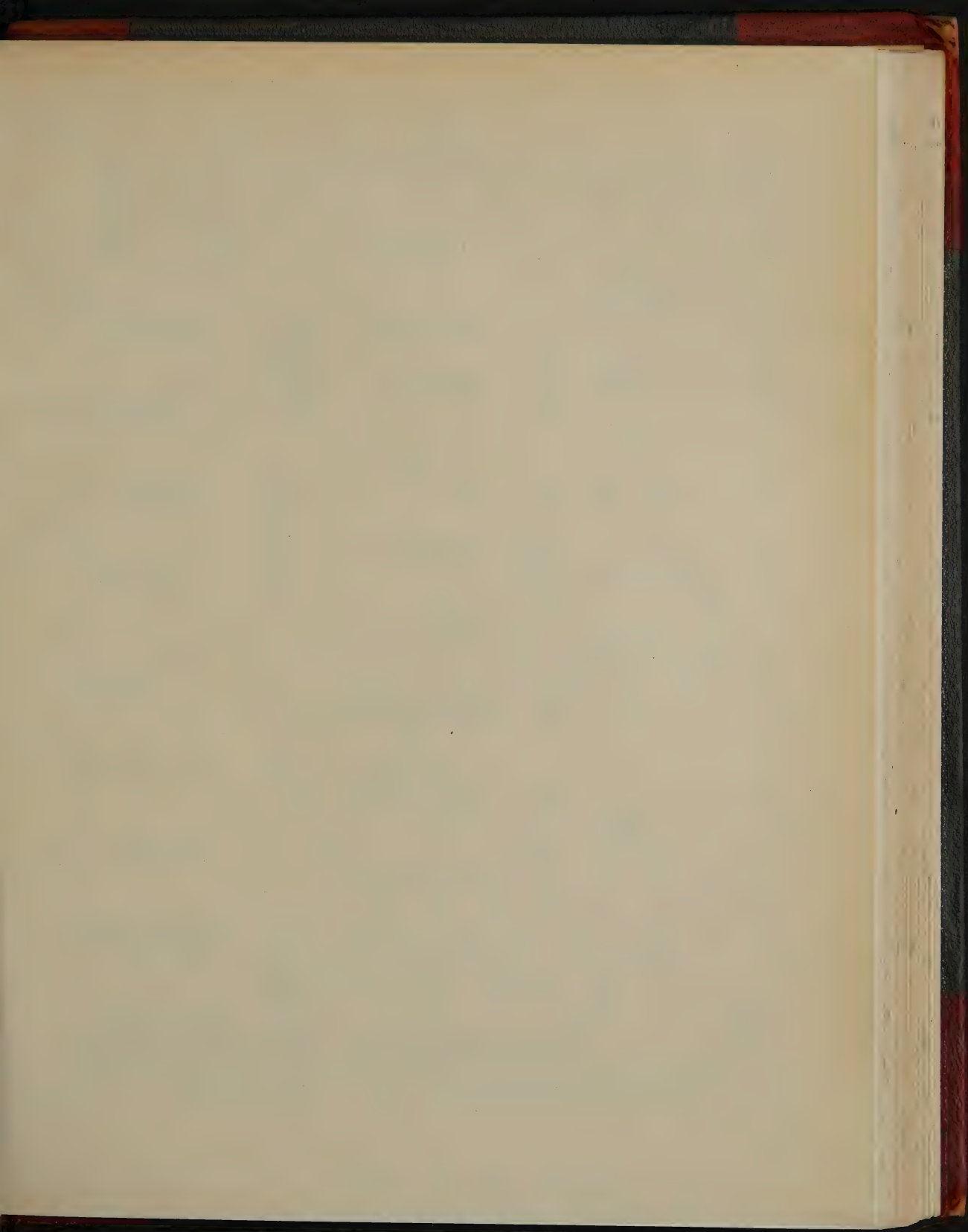


PLATE I.

PREPARATORY STAGES.

BUTTERFLIES.

FIG.		PAGE
1.	Larva of <i>Chrysophanus sabustius</i> . (Imago, Plate V., figs. 27, 28.)	36
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4.	Pupa of ditto.	
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6.	Pupa of ditto.	
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9.	Pupa of ditto.	
10.	Larva of <i>Chrysophanus boldenarum</i> . (Imago, Plate V., figs. 3, 4.)	38
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ARCTIADAE.

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NOCTUIDAE.

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GEOMETRIDAE.

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TORTRICIDAE.

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Some of the figures are magnified and in these the approximate length of the insect is shown by a line beside each figure.



PLATE II.

PREPARATORY STAGES.

NOCTUIDAE.		PAGE
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GEOMETRIDAE.		
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PYRALIDAE.		
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TINEIDAE.		
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Most of the figures are magnified and in these the approximate length of the insect is shown by a line beside each figure.



PLATE III.

PREPARATORY STAGES.

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	PSYCHIDAE.	
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13.	Larva of <i>Heliosibes atychioides</i> . (Imago, Plate XXXIII., fig. 23.)	306
14.	Larva of <i>Eulechria zophocssa</i> . (Imago, Plate XXXII., fig. 27.)	290
15.	Larva of <i>Agriophara coricopa</i> . (Imago, Plate XXV., figs. 11-12.)	296
16.	Larva of <i>Thiotricha thorybodes</i> in case. (Imago, Plate XXVII., fig. 16.)	254
19, 20.	Larvae of <i>Protosynaema steropucha</i> . (Imago, Plate XXXIV., fig. 2.)	326
21.	Pupa of ditto	326
22.	Larva of <i>Glyphipteryx iocheaera</i> . (Imago, Plate XXXIV., fig. 18.)	314
23.	Pupa of ditto.	
29.	Larva of <i>Borkhausenia chloradelpha</i> . (Imago, Plate XXX., fig. 4.)	266
30.	Larva of <i>Lysiphragma epixyla</i> . (Imago, Plate XXXIX., fig. 10.)	350
31.	Larva of <i>Izatha austera</i> . (Imago, Plate XXXII., fig. 6.)	282
32.	Larva of <i>Sinaethis combinatana</i> . (Imago, Plate XXXIII., fig. 29.)	307
33.	Larva of <i>Scoriodyta conisulia</i> in its case	354
34.	Ditto withdrawn from case. (Imago, Plate XXXVII., figs. 11-12.)	354
35.	Larva of <i>Glyphipteryx calliactis</i> . (Imago, Plate XXXIV., figs. 12-13.)	314
36.	Larva of <i>Erechthias hemiclistra</i> . (Imago, Plate XXXVI., fig. 21.)	335
37.	Pupa of ditto	335
	HEPIALIDAE.	
24.	Larva of <i>Porina dinodes</i> . (Imago, Plate XLII., figs. 6-7.)	360
26.	Larva of <i>Porina umbraculata</i> . (Imago, Plate XLI., figs. 1-3.)	363
27.	Larva of <i>Porina enysii</i> . (Imago, Plate XLI., figs. 4-10.)	361
28.	Larva of <i>Porina signata</i> . (Imago, Plate XLIII., figs. 2-4.)	363

Most of the figures are magnified and in these the approximate length of the insect is shown by a line beside each figure.



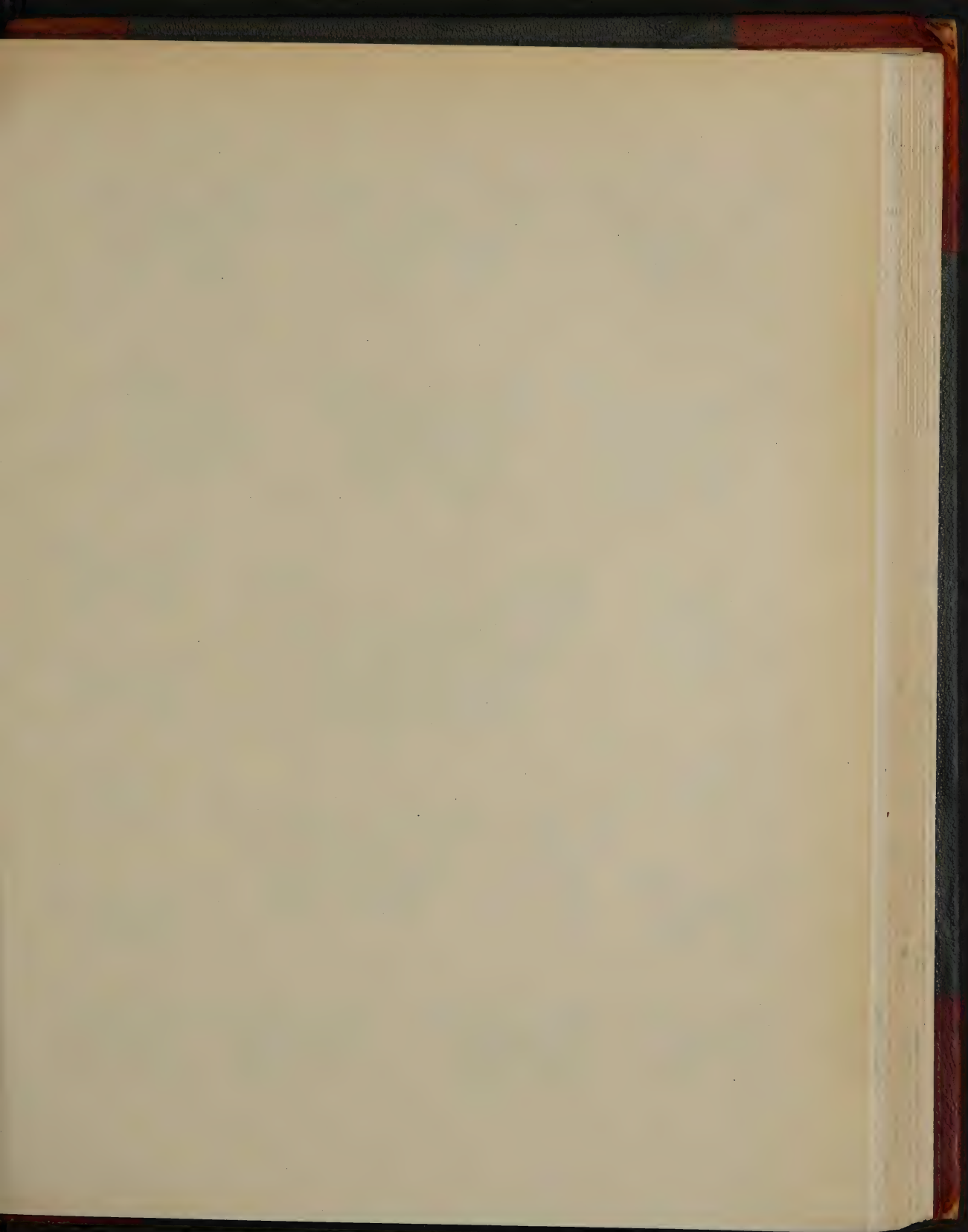


PLATE IV.

BUTTERFLIES.

FIG.		PAGE
1.	<i>Vanessa cardui</i> ♀ (Frontispiece fig. 1 egg; Plate I., figs. 11-13 larvae, fig. 14 pupa.)	36
9.	„ <i>gonerilla</i> ♀. (Frontispiece fig. 1 egg; Plate I., figs. 11-13 larvae, fig. 14 pupa.)	34
2.	„ „ underside.	
3.	<i>Erebia butleri</i> ♂ 31	
4.	„ „ ♀	
5.	„ „ underside of ♂	
6.	<i>Argyrophenga antipodum</i> ♂ (Dun Mountain form.) 29	
7.	„ „ ♀ „ „ „	
13.	„ „ ♂ (Southern mountain form.)	
14.	„ „ ♀ „ „ „	
18.	„ „ ♂ underside (typical form.)	
19.	„ „ ♂ upperside „ „	
20.	„ „ ♀. (Frontispiece, fig. 2 egg; Plate I., fig. 8 larva; 9 pupa.)	
8.	<i>Vanessa itea</i> ♀ 35	
10.	<i>Danaida plexippus</i> ♂ 26	
11.	„ <i>chrysippus</i> 28	
12.	„ „ underside.	
15.	<i>Precis vellida</i> 33	
16.	<i>Dodonidia helmsi</i> ♀ (Plate I., fig. 3 larva, 4 pupa.) 30	
17.	„ „ underside.	

All the figures are slightly less than the natural size.





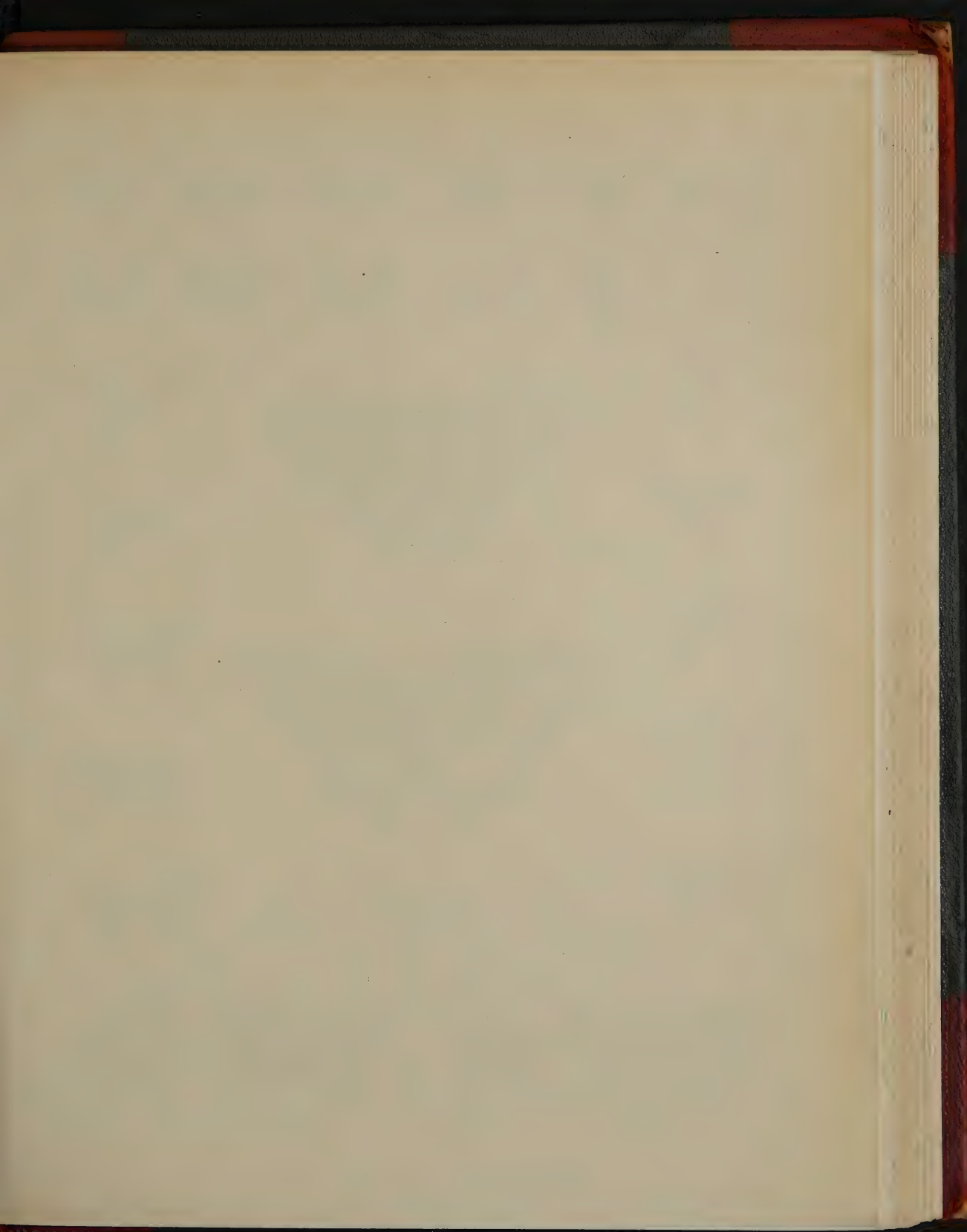


PLATE V.

BUTTERFLIES.

FIG.				PAGE
1.	<i>Chrysophanus boldenarum</i> *	♂	(Mount Arthur form.)	38
2.	"	♀	" " "	
3.	"	♂	(lowland Canterbury form.)	
4.	"	♀	" " "	
5.	"	♂	(Wakatipu mountain form.)	
6.	"	♀	" " "	
14.	"	♂	(lowland Nelson form.)	
15.	"	♀	" " "	
16.	"	♂	underside variety.	
17.	"	♀	" " "	
7.	"	<i>salustius</i> †	♂ (coastal form.)	36
8.	"	♀	" " "	
9.	"	♀	variety without submarginal spots.	
25.	"	♂	variety with confluent spots.	
24.	"		underside of ditto.	
26.	"	♂	(Canterbury form.)	
27.	"	♂	(Wellington inland form.)	
28.	"	♀	" " "	
21.	"		underside (Wellington inland form.)	
20.	"	♀	(High mountain form.)	
10.	"	<i>enysii</i> ‡	♂	38
11.	"	♀	"	
12.	"		underside	
22.	<i>Lycaena labradus</i>	♂		40
23.	"		underside	
18.	<i>Hypolimnas bolina</i>	♂		32
19.	"	♀		
13.	<i>Erebia pluto</i>	♂		31
30.	"	♀		
29.	"		underside	
31.	<i>Vanessa gonerilla</i> var. <i>ida</i>		underside. See Plate IV., figs. 2 and 9.)	35

All the figures are slightly less than the natural size.

*Plate I., fig. 10 larva.

†Frontispiece, fig. 3 egg; Plate I., fig. 1 larva; fig. 2 pupa.

‡Plate I., figs. 5, 7 larvae; fig. 6 pupa.





PLATE VI.

FIG.	SPHINGIDAE.	PAGE
15.	<i>Deilephila celerio</i>	42
16.	<i>Sphinx convolvuli</i> ♀	41
ARCTIADAE.		
1.	<i>Metaerias huttoni</i> ♂	43
3.	<i>Nyctemera annulata</i> ♂. (Frontispiece, fig. 4, egg.)	45
9.	<i>Metaerias strategica</i> ♀ (Plate I., fig. 20, larva.)	44
10.	" " ♂	
12.	" <i>erichrysa</i> ♂	43
18.	<i>Utetheisa pulchella</i> ♀	44
NOCTUIDAE.		
2.	<i>Leucania unia</i> ♂	52
4.	<i>Ichneutica ceraunias</i> ♂ (dark var.)	50
5.	" " ♂ (pale var.)	
6.	" " ♀ " "	
7.	<i>Euxoa admirationis</i> ♂	47
8.	<i>Ichneutica lindsayi</i> ♂	50
11.	<i>Homohadena fortis</i> ♂	49
13.	<i>Leucania purdii</i> ♀	52
14.	<i>Aletia nullifera</i> ♂	55
17.	<i>Andesia pessota</i> ♂	49
19.	<i>Leucania toroneura</i> ♂	52
20.	<i>Agrotis innominata</i> ♂	48
21.	" <i>ypsilon</i> ♀	48
22.	<i>Ichneutica dione</i> ♂	50
23.	" <i>lata</i> ♂	51
24.	" " ♀	
25.	<i>Euxoa radians</i> ♂	47
26.	<i>Heliothis armigera</i> ♂ (Plate I., figs. 15, 16 larvae.)	46

All the figures are slightly less than the natural size.





PLATE VII.

NOCTUIDAE.

FIG.		PAGE
1, 2.	<i>Graphiphora compta</i> ♂ varieties	48
3.	<i>Austramathes purpurea</i> ♀. (Plate I, fig. 26 larva.)	49
4.	<i>Euxoa ceropachoides</i> ♂	47
5.	<i>Leucania acontistis</i> ♂	52
6.	" <i>phaula</i> ♂	53
7.	" <i>lissoxylla</i> ♀	53
8.	" <i>alopa</i> ♂	53
9.	" <i>blenheimensis</i> ♀	53
10.	" <i>semivittata</i> ♂	53
11.	" <i>sulcana</i> ♀	53
12.	" <i>stulta</i> ♀	54
13.	<i>Aletia micrastra</i> ♀	54
14.	" <i>unipuncta</i> ♀	54
15.	" <i>moderata</i> ♂	55
16.	" <i>griseipennis</i> ♂. (Plate I, fig. 24, larva.)	55
17.	" <i>falsidica</i> ♀	56
18.	" <i>temenaula</i> ♂	56
19.	" <i>cucullina</i> ♂	58
20-22.	<i>Physetica caerulea</i> , varieties	59
23.	<i>Persectania disjungens</i> ♀	60
24.	" <i>steropastis</i> ♀. (Plate I, fig. 28, larva.)	60
25.	<i>Aletia fibrata</i> ♂	55
26.	<i>Persectania arotis</i> ♂	61
27.	" <i>composita</i> ♀	61
28.	" <i>atristriga</i> ♂	61
29.	" <i>propria</i> ♂	62
30.	<i>Erana graminosa</i> ♂. (Plate I, figs. 30, 31 larvae.)	62
31.	" " ♀	
32.	<i>Melanchra rhodopleura</i> ♂. (Plate I, figs. 32, 33 larvae.)	63
33.	" <i>pictula</i> ♂	63

All the figures are slightly less than the natural size.





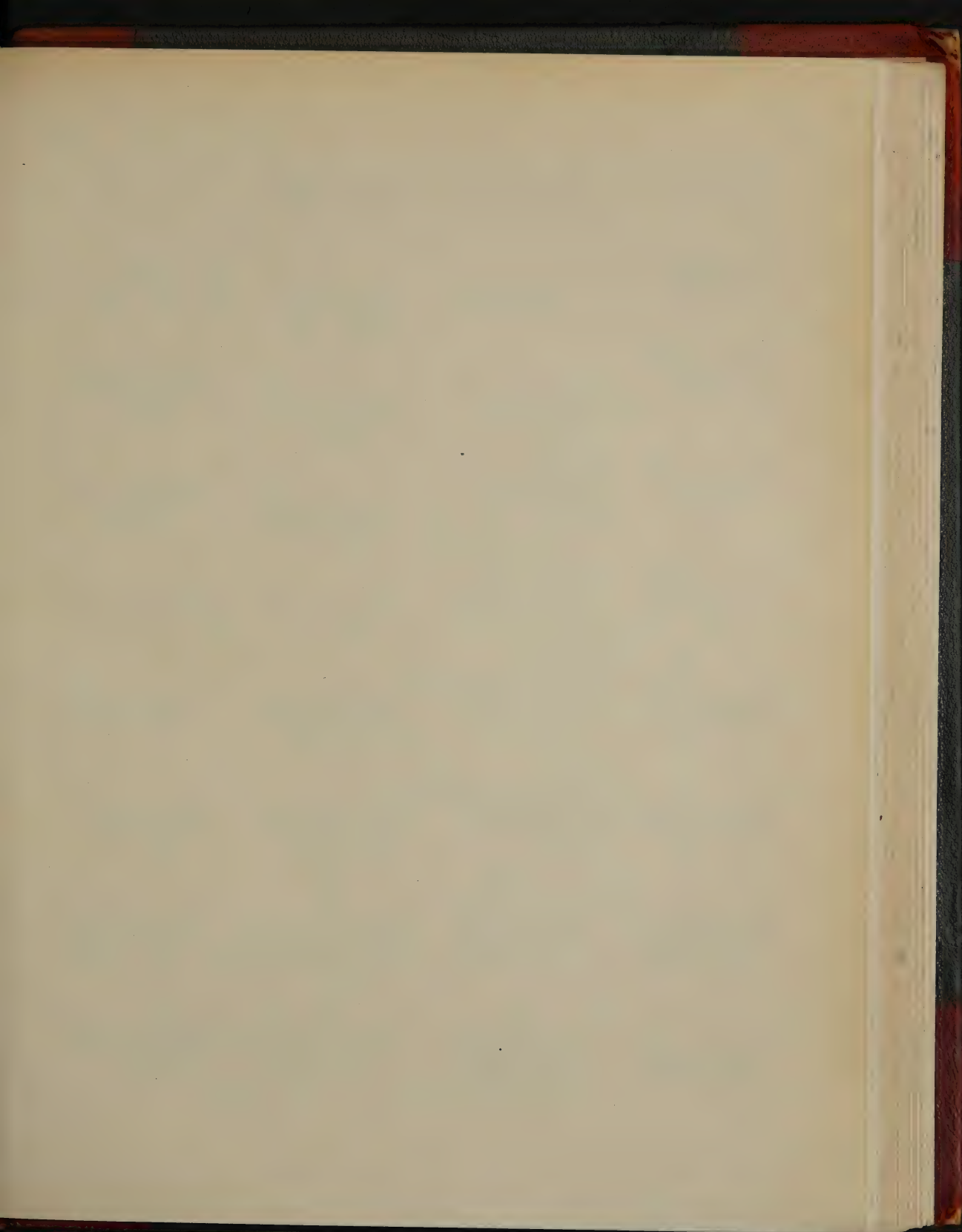


PLATE VIII.

NOCTUIDAE.

FIG.		PAGE
1.	<i>Melanchra exquisita</i> ♂	63
2.	" <i>octans</i> ♀	64
3, 4.	" <i>plena</i> ♂ varieties. (Plate I, fig. 25, larva.)	65
5.	" <i>decorata</i> ♂	70
6.	" <i>pauca</i> ♂	64
7.	" <i>diatmeta</i> ♂	69
8.	" <i>maya</i> ♀	64
9.	" <i>grandiosa</i> ♀	64
10.	" <i>insignis</i> ♂. (Frontispiece figs. 7, 8, egg.)	35
11, 12.	" " ♀ varieties.	
13.	" <i>mutans</i> ♂. (Plate I, fig. 27, larva.)	66
14.	" " ♀	
15.	" <i>bronias</i> ♀	67
16.	" <i>ustistriga</i> ♂. (Frontispiece, fig. 6, egg; Plate I, fig. 29, larva.)	68
17.	" " ♀	
18.	" <i>oliveri</i> ♀	69
19.	" <i>infensa</i> ♂	70
20.	" <i>coeleno</i> ♂	69
21.	" <i>lignana</i> ♂. (Frontispiece, fig. 5, egg.)	71
22.	" <i>morosa</i> ♂	74
23.	" <i>paracausta</i> ♂	68
24.	" " ♀	
25.	" <i>alcyone</i> ♀	70
26, 27.	" <i>omoplaca</i> ♂ varieties	70
28.	" <i>levis</i> ♂. (Plate XLVIII., fig. 18.)	74
29.	<i>Aletia inconstans</i> ♂	57
30.	<i>Melanchra asterope</i> ♀	72
31.	" <i>agorastis</i> ♂	73
32.	" <i>tartarea</i> ♂	72
33.	" " ♂ variety	
34.	" <i>dotata</i> ♂	72
35.	" <i>stipata</i> ♂	71
36.	" " ♀	

All the figures are slightly less than the natural size.







PLATE IX.

NOCTUIDAE.

FIG.		PAGE
1, 2.	<i>Melanchra pascui</i> ♂ varieties	71
3.	" " ♀	
4.	" <i>rubescens</i> ♂	71
5.	" " ♀	
6.	" <i>chryserythra</i> ♂	75
7.	" " ♀	
8.	" <i>pansicolor</i> ♀	69
9.	<i>Aletia panda</i> ♂	57
10.	<i>Melanchra chlorodonta</i> ♂	66
11.	" <i>phricias</i> ♀	75
12.	" <i>praesignis</i> ♀. (Plate XLVIII., fig. 6.)	66
29.	" " ♂	
13.	" <i>vitiosa</i> ♂	73
14.	" <i>oethistis</i> ♀	73
15.	<i>Ichnutica cana</i> ♂	50
16.	<i>Leucania harti</i> ♂	54
17.	<i>Aletia obsecrata</i> ♂	58
18.	" " ♀	
19.	" <i>cuneata</i> ♀	56
20.	<i>Leucania pagaia</i> ♂	52
21.	<i>Melanchra mutans</i> , variety ♀	66
22.	" <i>prionistis</i> ♀	75
23.	" <i>homoseia</i> ♀. (Plate I., fig. 18, larva.)	74
24.	" <i>lithias</i> ♀	74
25.	<i>Aletia longstaffi</i> ♂	58
26.	<i>Melanchra sequens</i> ♂	75
27.	" <i>mollis</i> ♂	68
28.	<i>Cosmophila flava</i> ♀	83
30.	<i>Melanchra olivæa</i> ♂	67
31.	" " ♀. (Plate XLIV., fig. 32, variety.)	

All the figures are slightly less than the natural size.







PLATE X.

NOCTUIDAE.

FIG.		PAGE
1.	<i>Aletia sollemnis</i> ♂	58
2.	<i>Melanchra beata</i> ♂	67
3.	„ <i>erebia</i> ♀	67
4.	<i>Dipaustica epiatra</i> ♂. (Plate I., fig. 17, larva.)	59
5.	<i>Plusia chalcites</i> ♀ (Frontispiece, fig. 10, egg; Plate II., fig. 1, larva.)	79
6.	<i>Rhaphsa scotosialis</i> ♂ (Frontispiece, fig. 9, egg.)	82
7.	„ „ ♀	
8.	<i>Ohpiusa melicerte</i> ♀	78
9.	<i>Hypenodes costistrigalis</i> ♂	77
10.	<i>Bityla pallida</i> ♂	76
11.	„ <i>sericea</i> ♂	76
12.	„ <i>defigurata</i> ♀	76
13.	<i>Dasyptodia selenophora</i> ♀ (Plate II., fig. 26, larva.)	80
14.	<i>Aletia empyrea</i> ♂	59
15.	„ „ ♀	
16.	<i>Hypenodes anticlina</i> ♀	78
17.	<i>Cosmodes elegans</i> ♀	77
18.	<i>Catada lignicolaria</i> ♂	78
19.	<i>Ariathisa comma</i> ♂	76
20.	„ „ ♀	
21.	<i>Spodoptera mauritia</i> ♂	77
22.	<i>Plusia oxygramma</i> ♂	80
23.	„ „ ♀	
24.	<i>Melanchra merope</i> ♂	72
25.	<i>Aletia parmata</i> ♂	58
26.	<i>Mocis alterna</i> ♀	79
27.	<i>Anomis sabulifera</i> ♀	82
28.	<i>Melanchra temperata</i> ♂	75

All the figures are slightly less than the natural size except fig. 9, which is slightly enlarged.



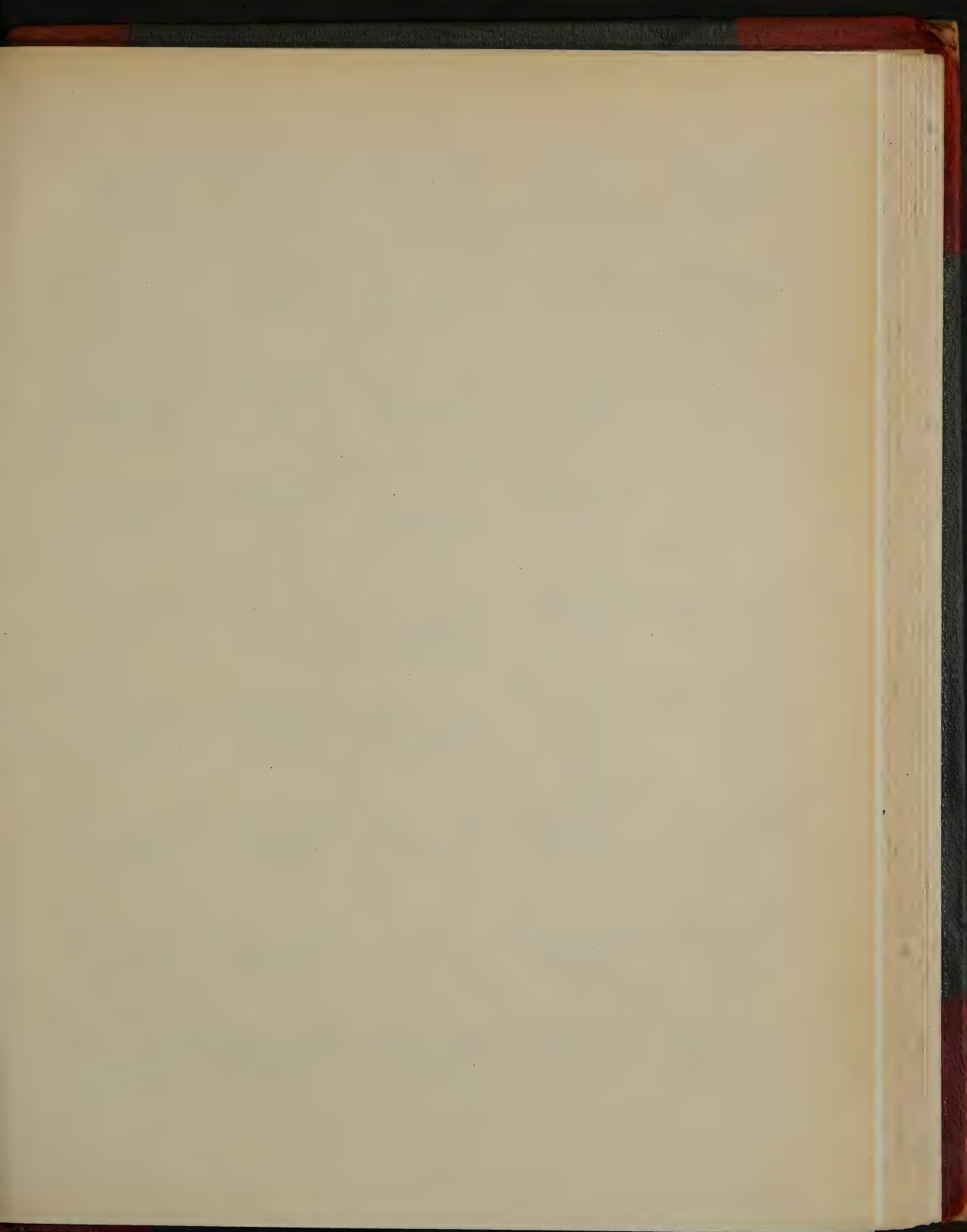


PLATE XI.

GEOMETRIDAE.

FIG.		PAGE
1.	<i>Microdes quadristrigata</i>	88
2.	" <i>epicryptis</i> ♀	88
3.	<i>Phrissogonus laticostatus</i> ♂	88
4.	" " ♀	
5.	<i>Chloroclystis semialbata</i> ♂ (Plate I., fig. 42, larva.)	89
6.	" " ♀	
7.	<i>Phrissogonus testulatus</i> ♂	89
8.	<i>Chloroclystis bilineolata</i> ♂ (Plate XLIV., fig. 4.)	93
9.	" <i>humilis</i> ♀	97
10.	" <i>plinthina</i> ♂	90
11-13.	" <i>sandyeias</i> . (Plate I., figs. 37, 38, larvae.)	90
14.	" <i>melochlora</i> ♂	91
15.	" <i>muscosata</i> ♀ (Plate I., fig. 44, larva.)	91
16.	" <i>nereis</i> ♀	96
17.	" <i>dryas</i> ♂ (Plate I., fig. 39, larva.)	93
18.	<i>Xanthorhoe ida</i> ♂	116
19.	<i>Chloroclystis lacustris</i> ♂	92
20.	" <i>paralodes</i> ♂ (Plate I., figs. 40, 41, larvae.)	92
21.	" " ♀	
22, 23.	" <i>lunata</i> ♂ varieties. (Plate I., fig. 23, larva.)	93
24, 25.	" " ♀ varieties	
26.	" <i>aristias</i> ♀	94
27.	" " ♂	
28.	" <i>fumipalpata</i> ♂	96
29, 30.	" <i>lichenodes</i> ♂, ♀ varieties	95
31.	" <i>sphragitis</i> ♀ (Plate I., fig. 36, larva.)	96
32.	" <i>malachita</i> ♂	95
33.	" <i>magnimaculata</i> ♀	95
34.	" <i>furva</i> ♂	94
35.	" <i>erratica</i> ♂	94
36.	<i>Xanthorhoe homalocyma</i> ♂	112
37.	<i>Paradetis porphyrias</i> ♂	109
38.	" " ♀	
39.	<i>Euchoeca rubropunctaria</i> ♂	104
40.	" " ♀	
41.	<i>Xanthorhoe emerearia</i> ♂	112
42.	" " ♂ subalpine southern form	
43.	" <i>practica</i> ♂	111
44.	" <i>cinnabaris</i> ♂	111
45.	<i>Hydriomena siria</i> ♂	98

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



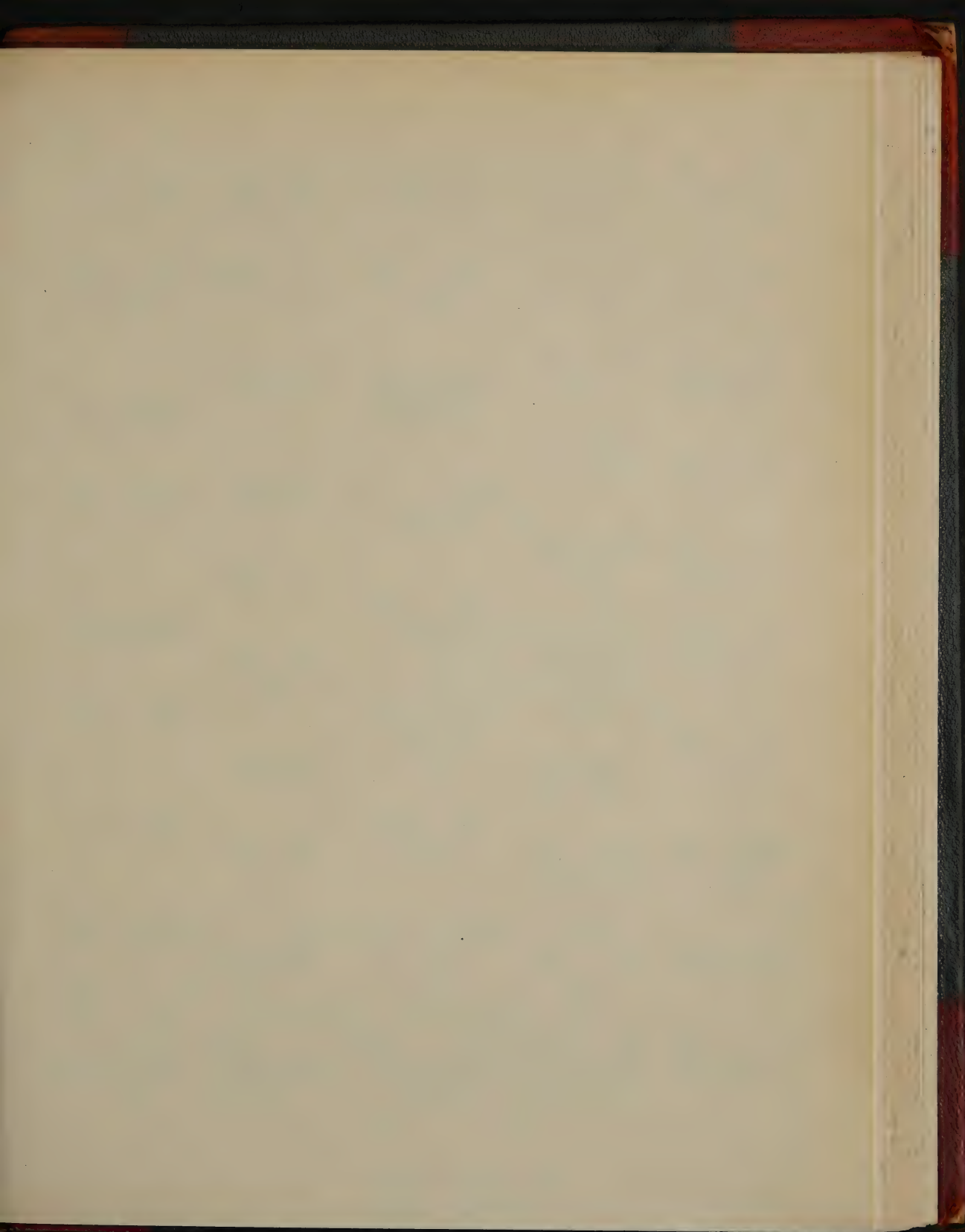


PLATE XII.

GEOMETRIDAE.

FIG.		PAGE
1.	Tatosoma fasciata ♀ (Plate XLIV., fig. 31 ♂.)	86
2.	" timora ♂	86
3.	" " ♀	
4.	" lestevata ♂	85
5.	" " ♀	
6.	" agrionata ♂	85
7.	" " ♀	
8.	" tipulata ♂	85
9.	" " ♀	
10.	" alta ♂	86
11.	" " ♀	
12.	" topia ♂	87
13.	" " ♀	
14.	Elvia glauca ♀ (Plate I., figs. 34, 35, larvae.)	87
15.	" " ♂	
16.	Chloroclystis suffusa, n.sp. ♀	97
17.	" halianthes ♂	95
18.	" clarkei ♂	96
19.	" rubella ♂	94
20.	Eucymatoge arenosa ♂	97
21.	" gobiata ♂ (Plate I., fig. 45, larva.)	97
22.	" anguligera ♂ (Plate I., fig. 46, larva.)	98
23.	" " ♀	
24, 25, 27.	Hydriomena deltoidata ♂ varieties. (Frontispiece, fig. 12, egg; Plate II., fig. 40, larva.)	101
26, 28.	Hydriomena deltoidata ♀ varieties	
29.	Asthena pulchra ♂	103
30.	" " ♀	
31.	" subpurpureata ♂ (Plate I., fig. 47, larva.)	103
32.	" " ♀	
33, 34.	Hydriomena arida varieties	100
35.	" hemizona ♂	100
36.	" " ♀	
37.	" subochraria ♂	102
38.	Xanthorhoe clandestina ♂	113
39.	Hydriomena lithurga ♂	103
40.	" triphragma ♂	98
41.	" canescens ♂	101
42.	" expolita ♂	98
43.	" rixata ♂ North Island form	99
44.	" " South Island form	
45.	" purpurifera ♀	99
46.	" similata ♂ (Plate II., fig. 2, larva.)	99
47.	" callichora ♀ lowland form (Plate II., fig. 3, larva.)	100
48.	" " ♂ mountain form (Plate XLVIII., fig. 19 variety.)	

All the figures are slightly less than the natural size.





PLATE XIII.

GEOMETRIDAE.

FIG.		PAGE
1-3.	Venusia undosata ♂ varieties. (Plate I., fig. 43, larva.)	105
4.	" " ♀	
5.	" xanthaspis ♂	106
6.	" charidema ♂	105
7.	" " ♀	
8.	Xanthorhoe dissimilis ♂	119
9.	Venusia vermiculata ♂ (Frontispiece, fig. 11, egg; Plate I., fig. 22, larva.)	104
10.	" " ♀	
11.	Xanthorhoe bulbulata ♂	111
12.	" camelias ♂	114
13.	" " ♀	
14, 15.	Asaphodes megaspilata ♂ varieties. (Frontispiece, fig. 15, egg; Plate I., fig. 21, larva.)	108
16.	" " ♀	
17.	" rufescens ♂	108
18.	" " ♀	
19.	" abrogata ♂	107
20.	" " ♀	
21.	" stephanitis ♂	107
22.	Xanthorhoe orophylla ♂	110
23.	" " ♀	
24.	Asaphodes parora ♂	108
25.	" " ♀	
26.	Xanthorhoe nebulosa ♀	115
27.	" cedrinodes ♂ lowland form	114
28.	" " ♂ mountain form	
29.	" umbrosa ♂	115
30.	" subobscureata ♀	115
31.	Hydriomena subrectaria ♀	102
32.	Xanthorhoe limonodes ♂	116
33.	" " ♀	
34.	" subductata ♀	112
35.	" venipunctata ♂	112
36.	" periphæa ♂	113
37.	" semisignata ♂ (Frontispiece, fig. 14, egg.)	113
38.	" orophylloides ♂	110
39.	" chlamydata ♀	109
40.	" obarata ♂	117
41.	" rosearia ♂ (Frontispiece, fig. 13, egg.)	110
42.	" " ♀	
43.	" chionogramma ♀	114
44.	" " ♂	
45.	" lophogramma ♂	110
46.	" " ♀	
47.	" semifissata ♂	110
48.	" " ♀	
49.	" prasinias ♂	116
50.	" oxyptera ♂	122

All the figures are slightly less than the natural size.



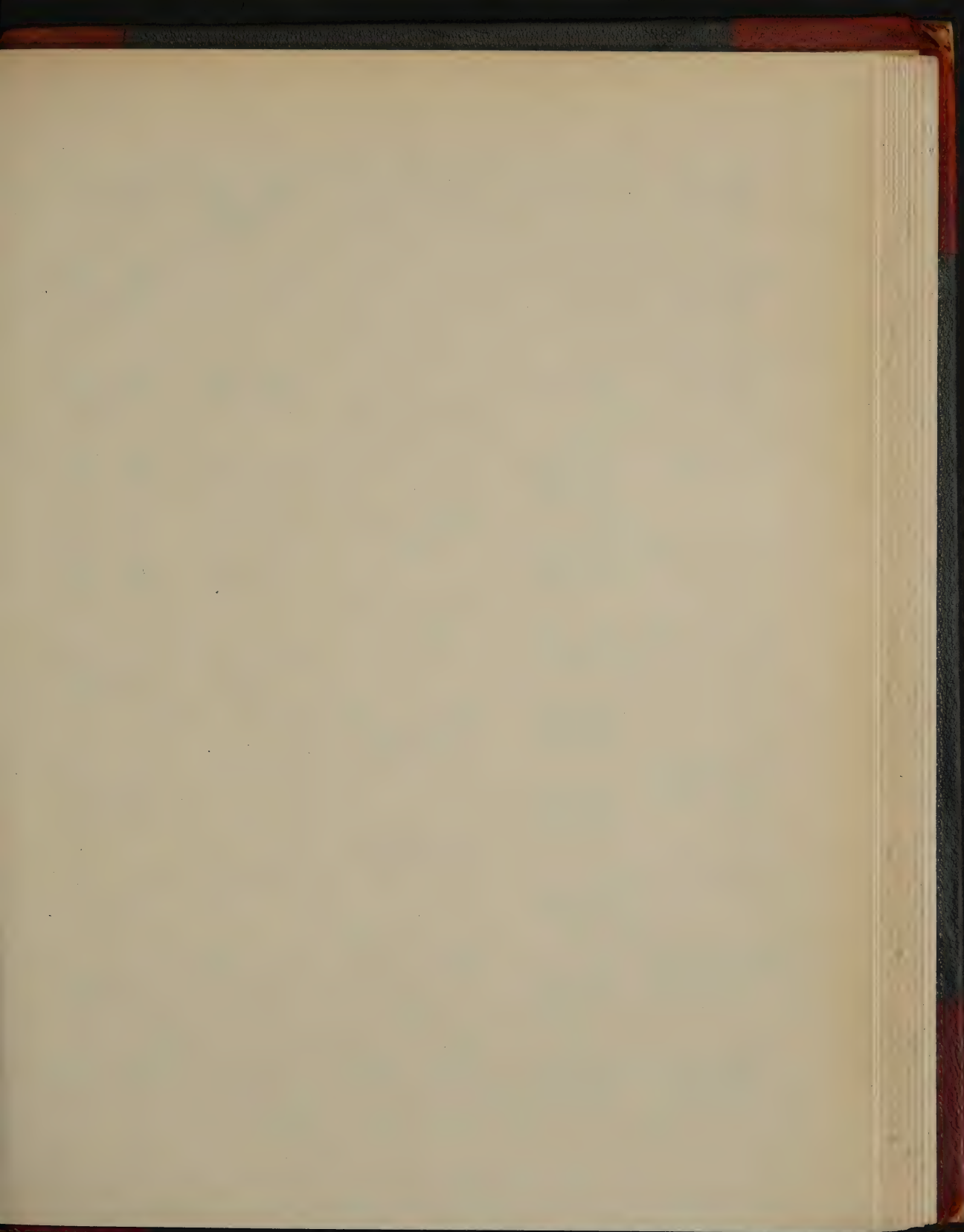


PLATE XIV.

GEOMETRIDAE.

FIG.										PAGE
1.	Xanthorhoe	beata	♂	.....	.....	.....	.....	.....	.....	116
2.	"	"	♀	.....	.....	.....	.....	.....	.....
3.	"	benedicta	♂	.....	.....	.....	.....	.....	.....	117
4.	"	"	♀	.....	.....	.....	.....	.....	.....
5.	"	adonis	♂	.....	.....	.....	.....	.....	.....	117
6.	"	prymnaca	♂	.....	.....	.....	.....	.....	.....	118
7.	"	"	♀	.....	.....	.....	.....	.....	.....
8.	"	exoriens	♂	.....	.....	.....	.....	.....	.....	121
9.	"	dionysius	♂	.....	.....	.....	.....	.....	.....	120
10.	"	helias	♂	.....	.....	.....	.....	.....	.....	120
11.	"	chlorocapna	♂	.....	.....	.....	.....	.....	.....	114
12.	Orthoclydon	pseudostinaria	♂	.....	.....	.....	.....	.....	.....	107
13.	Xanthorhoe	stinaria	♂	.....	.....	.....	.....	.....	.....	122
14.	"	occulta	♂	.....	.....	.....	.....	.....	.....	122
15.	"	"	♀	.....	.....	.....	.....	.....	.....
16.	"	imperfecta	♂	.....	.....	.....	.....	.....	.....	121
17.	"	albilineata	♂	.....	.....	.....	.....	.....	.....	120
18.	"	aegrota	♂	.....	.....	.....	.....	.....	.....	120
19.	"	recta	♂	.....	.....	.....	.....	.....	.....	120
20.	"	sericeodes	♂	.....	.....	.....	.....	.....	.....	121
21.	Orthoclydon	praelectata	♂	(Plate II., figs. 16, 17, larvae.)					.....	106
22.	"	"	♀	.....	.....	.....	.....	.....	.....
23.	Xanthorhoe	stricta	♂	.....	.....	.....	.....	.....	.....	119
24.	"	"	♀	.....	.....	.....	.....	.....	.....
25.	"	declarata	♂	.....	.....	.....	.....	.....	.....	119
26.	"	clarata	♂	.....	.....	.....	.....	.....	.....	118
27.	"	"	♀	.....	.....	.....	.....	.....	.....
28.	"	cataphracta	♂	.....	.....	.....	.....	.....	.....	119
29.	"	"	♀	.....	.....	.....	.....	.....	.....
30.	"	oraria	♂	.....	.....	.....	.....	.....	.....	121
31.	"	mnesichola	♂	.....	.....	.....	.....	.....	.....	122
32.	"	"	♀	.....	.....	.....	.....	.....	.....
33.	Notoreas	synclinalis	♂	.....	.....	.....	.....	.....	.....	122
34.	"	"	♀	.....	.....	.....	.....	.....	.....
35.	"	anthracias	♂	.....	.....	.....	.....	.....	.....	124
36.	"	atmogramma	♂	.....	.....	.....	.....	.....	.....	124
37.	"	"	♀	.....	.....	.....	.....	.....	.....
38.	"	mechanitis	♂	.....	.....	.....	.....	.....	.....	124
39.	"	areolata	♀	.....	.....	.....	.....	.....	.....	125
40.	"	paradelpha	♂	.....	.....	.....	.....	.....	.....	124
41.	"	omichlias	♂	.....	.....	.....	.....	.....	.....	127
42.	"	niphoerena	♂	.....	.....	.....	.....	.....	.....	126
43.	"	"	♀	.....	.....	.....	.....	.....	.....
44.	"	simplex	♀	.....	.....	.....	.....	.....	.....	126
45.	Xanthorhoe	nephelias	♂	.....	.....	.....	.....	.....	.....	121
46.	Orthoclydon	chlarias	♂	variety. (Plate XLIX., figs. 1-2.)					.....	107
47.	Notoreas	insignis	♂	.....	.....	.....	.....	.....	.....	123
48.	"	"	♀	.....	.....	.....	.....	.....	.....
49.	"	orphnaca	♂	.....	.....	.....	.....	.....	.....	123
50.	"	"	♀	.....	.....	.....	.....	.....	.....

Except fig. 11, all the figures are slightly less than the natural size.





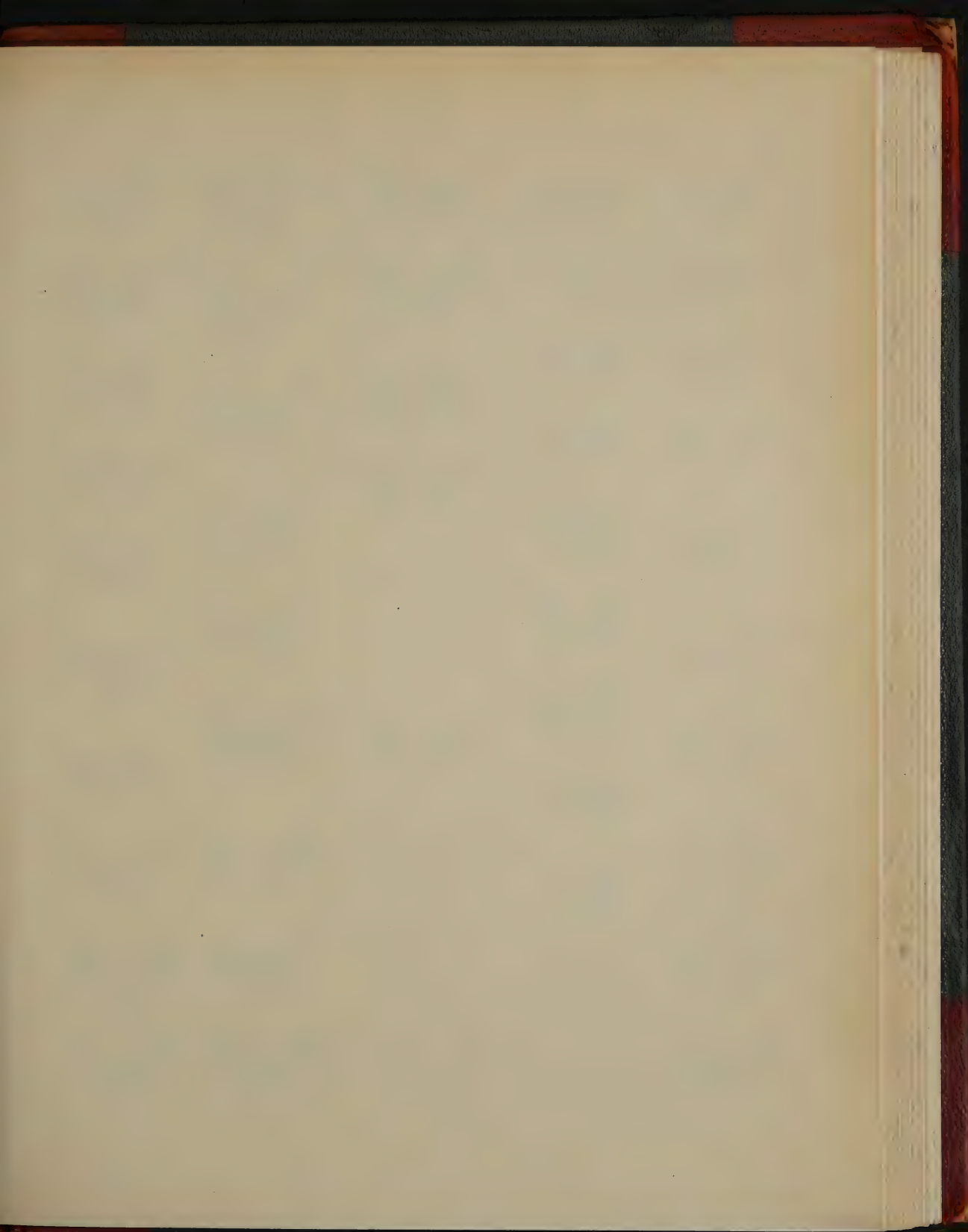


PLATE XV.

GEOMETRIDAE.

FIG.		PAGE
1.	<i>Notoreas isoleuca</i> ♀	125
2.	<i>Lythria chrysopeda</i> ♂	132
3.	" " ♀	
4.	" <i>siris</i> ♂	131
5.	" " ♀	
6.	" <i>catapyrrha</i> ♂	131
7.	" <i>fulva</i> ♂	127
8.	<i>Leptomeris rubraria</i> ♂ (Frontispiece, fig. 23, egg; Plate II., fig. 23, larva.)	132
9.	<i>Xanthorhoe cymozeucta</i> ♂	118
10.	" " ♀	
11.	<i>Dichromodes cynica</i> ♂	134
12.	" <i>sphaeriata</i> ♂	134
13.	" <i>nigra</i> ♂	134
14.	" <i>simulans</i> ♂	134
15.	" <i>gypsotis</i> ♂	135
16.	<i>Notoreas opipara</i> ♂	123
17.	<i>Dichromodes ida</i> ♂	134
18.	<i>Chloroclystis rivalis</i> ♀ (From Mount Ruapehu.)	90
19.	" <i>acompsa</i> ♂	94
20.	<i>Dasyuris hectori</i> , variety ♂	128
21.	" " typical form ♂	128
22.	" <i>callicrena</i> ♂	130
23.	<i>Notoreas villosa</i> ♂	123
24.	" " ♀	
25.	<i>Dasyuris anceps</i> ♀	128
26.	<i>Epirrhantis hemipteraria</i> ♂	135
27.	" " ♀	
28.	" " ♂ variety	
29.	<i>Notoreas galaxias</i> n.sp.	125
30.	" <i>ischnocyma</i> ♀	126
31.	<i>Dasyuris pluvialis</i> ♂	129
32, 33.	<i>Notoreas brephos</i> ♂ varieties	126
34.	" <i>ferox</i> ♀	126
35.	" <i>vulcanica</i> ♂	127
36.	<i>Dichromodes nigra</i> ♀ pale variety	134
37.	<i>Adeixis griseata</i> ♂	133
38.	<i>Theoxena seissaria</i>	133
39.	<i>Samana acutata</i> ♀	133
40.	<i>Dasyuris transaurea</i> ♂	130
41-43.	<i>Lythria perornata</i> ♀ varieties. (Plate II., figs. 32, 33, larvae.)	131
44.	<i>Dasyuris fulminea</i> ♂	129
45.	" <i>leucobathra</i> ♀	130
46.	" <i>enysii</i> ♂	128
47.	" <i>partheniata</i> ♂	129
48.	<i>Notoreas incompta</i> ♂	124
49.	<i>Dasyuris strategica</i> ♀	130

Some of the figures are magnified and in these the approximate expanse of the wings is shown by a line beneath each figure.





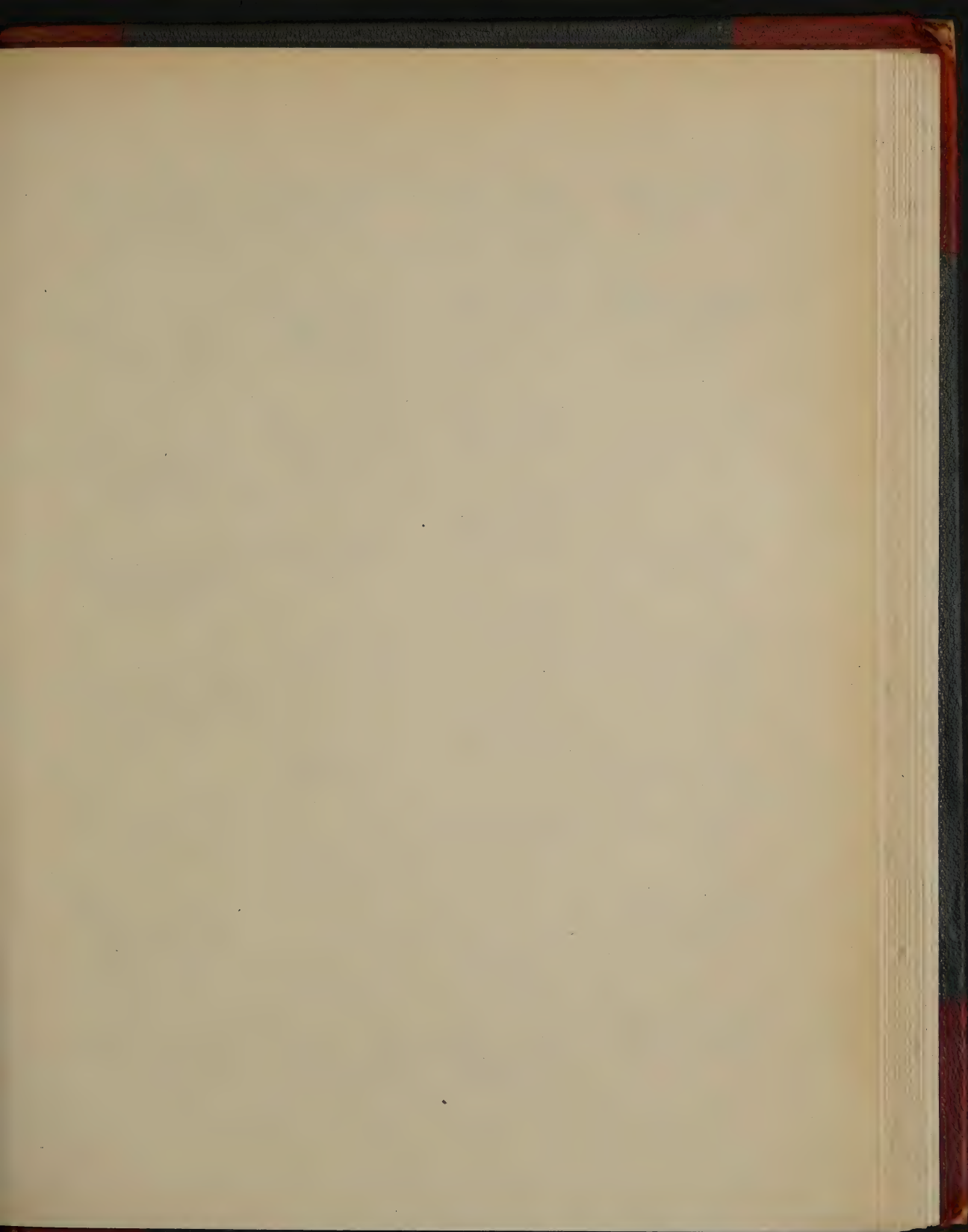


PLATE XVI.

GEOMETRIDAE.

FIG.		PAGE
1.	<i>Selidosema fascialata</i> ♂	139
2.	" " ♀	
3.	<i>Epirhantis ustaria</i> ♂ (Frontispiece, fig. 16, egg; Plate II., figs. 9, 10, 11, 18, larvae.)	135
4.	" " ♀	
5.	" <i>aleetoraria</i> ♂	136
6-8.	" " ♀ varieties. (See also Plate XLVIII., fig. 33.)	
9, 10.	<i>Selidosema productata</i> ♂ varieties	139
11.	" " ♀	
12.	" <i>leucelaea</i> ♂ (Plate II., fig. 14, larva.)	141
13.	" " ♀	
14, 15.	" <i>pclurgata</i> ♂ varieties. (Plate II., fig. 4, larva.)	137
16, 17.	" " ♀ varieties	
18, 19.	" <i>suavis</i> ♂ varieties. (Frontispiece, fig. 18, egg; Plate II., fig. 22, larva.)	142
20-22.	" " ♀ varieties	
23.	" <i>rudata</i> ♂ (Plate II., fig. 20, larva.)	143
24.	" " ♀ large southern form	
25.	" <i>monacha</i> ♂	141
26.	" " ♀	
27.	" <i>lactiflua</i> ♂	140
28.	" " ♀	
29.	" <i>scariphota</i> ♂ (Plate II., fig. 19, larva.)	138
30.	" <i>aristarcha</i> ♂ (Plate II., fig. 31, larva.)	137
31.	" " ♀	
32.	" <i>lutea</i> ♂	143
33.	" " ♀	
34.	" <i>terrena</i> ♂	140

All the figures are slightly less than the natural size.





PLATE XVII.

GEOMETRIDAE.

FIG.		PAGE
1.	<i>Selidosema indistincta</i> ♂ (Plate II., fig. 15, larva.)	140
2.	" " ♀	
3.	" <i>albifasciata</i> ♂	142
4.	" " ♀	
5.	" <i>lupinata</i> ♂	143
6.	" " ♀	
7.	<i>Azelina fortinata</i> ♂ (Plate II., figs. 12, 13, larvae.)	148
8.	" " ♀	
9.	<i>Hybernia indocilis</i> ♂	147
10.	" " ♀	
11.	<i>Selidosema argentaria</i> ♂	144
12.	" " ♀	
13.	" <i>fenerata</i> ♂ (Plate II., fig. 24, larva.)	144
14.	" " ♀	
15, 17.	<i>Azelina variabilis</i> ♂ varieties (Plate II., fig. 5, larva.)	148
16, 18.	" " ♀ varieties	
19.	<i>Declana hermione</i> ♂	152
20, 22.	<i>Selidosema panagrata</i> ♂ varieties (Plate II., fig. 25, larva.)	144
21, 23.	" " ♀ varieties	
24.	" <i>dejectaria</i> ♂ (Frontispiece, fig. 19, egg.)	145
25, 26.	" " ♀ varieties	
27.	<i>Gargaphia neoselena</i> ♀	148
28.	<i>Sestra humeraria</i> ♂	146
29.	" " ♀	
30.	" <i>flexata</i> ♂ pale form	146
31.	" " ♀ " "	
32.	" " ♀ typical form. (Frontispiece, fig. 20, egg; Plate II., fig. 8, larva.)	
33.	" " ♀ dark variety	
34, 35.	<i>Gargaphia muriferata</i> ♂ varieties. (Plate II., fig. 7, larva.)	147
36.	" " ♀	

All the figures are slightly less than the natural size.





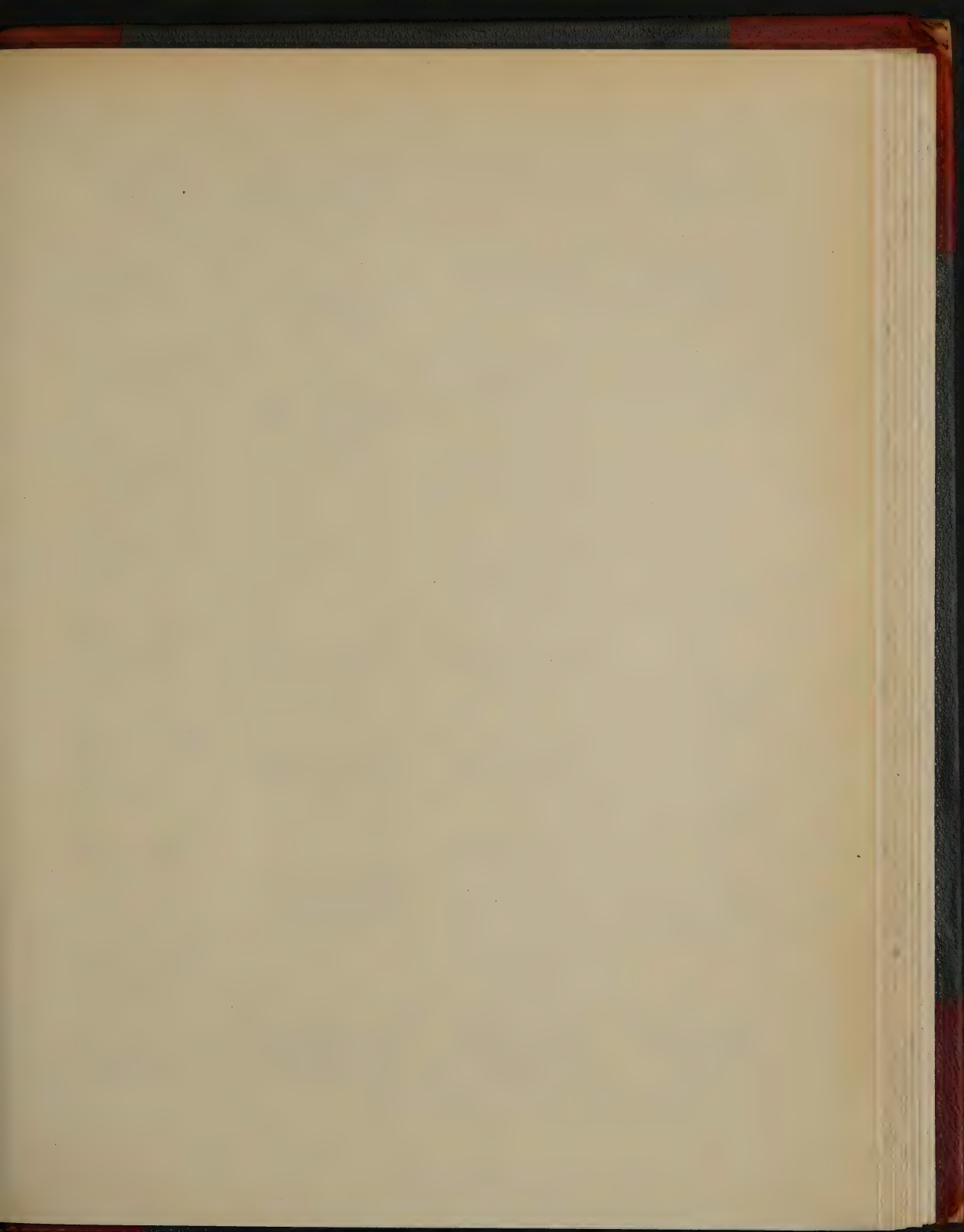


PLATE XVIII.

GEOMETRIDAE.

FIG.		PAGE
1-4.	<i>Azelina gallaria</i> ♂ varieties. (Plate II., fig. 6, larva.)	149
5, 6.	" " ♀ "	
7.	" <i>nelsonaria</i> ♂	150
8.	" " ♀	
9.	<i>Declana glacialis</i> ♂	153
10.	" " ♀	
11.	" <i>junetilinea</i> ♂ North Island form.	152
12.	" " ♀ " " "	
13.	" " ♂ South Island form. (Plate II., fig. 27, larva.)	
14.	" " ♀ " " " " " "	
15.	" <i>griseata</i> ♂	151
16.	" " ♀	
17.	" <i>egregia</i> ♂	154
18.	" <i>atronivea</i> ♂	153
19.	" <i>niveata</i> ♂	151
20.	" <i>feredayi</i> ♂ light variety	152
21.	" " ♂ dark variety	"
22.	" " ♀	
23-29.	" <i>floccosa</i> ♂ varieties. (Frontispiece, fig. 17, egg.)	151
30-34.	" " ♀ "	
35.	" <i>leptomera</i> ♂ variety	150
36.	" " ♂ typical form	
37.	" " ♀ " " (Plate II., fig. 21, larva.)	

All the figures are slightly less than the natural size.



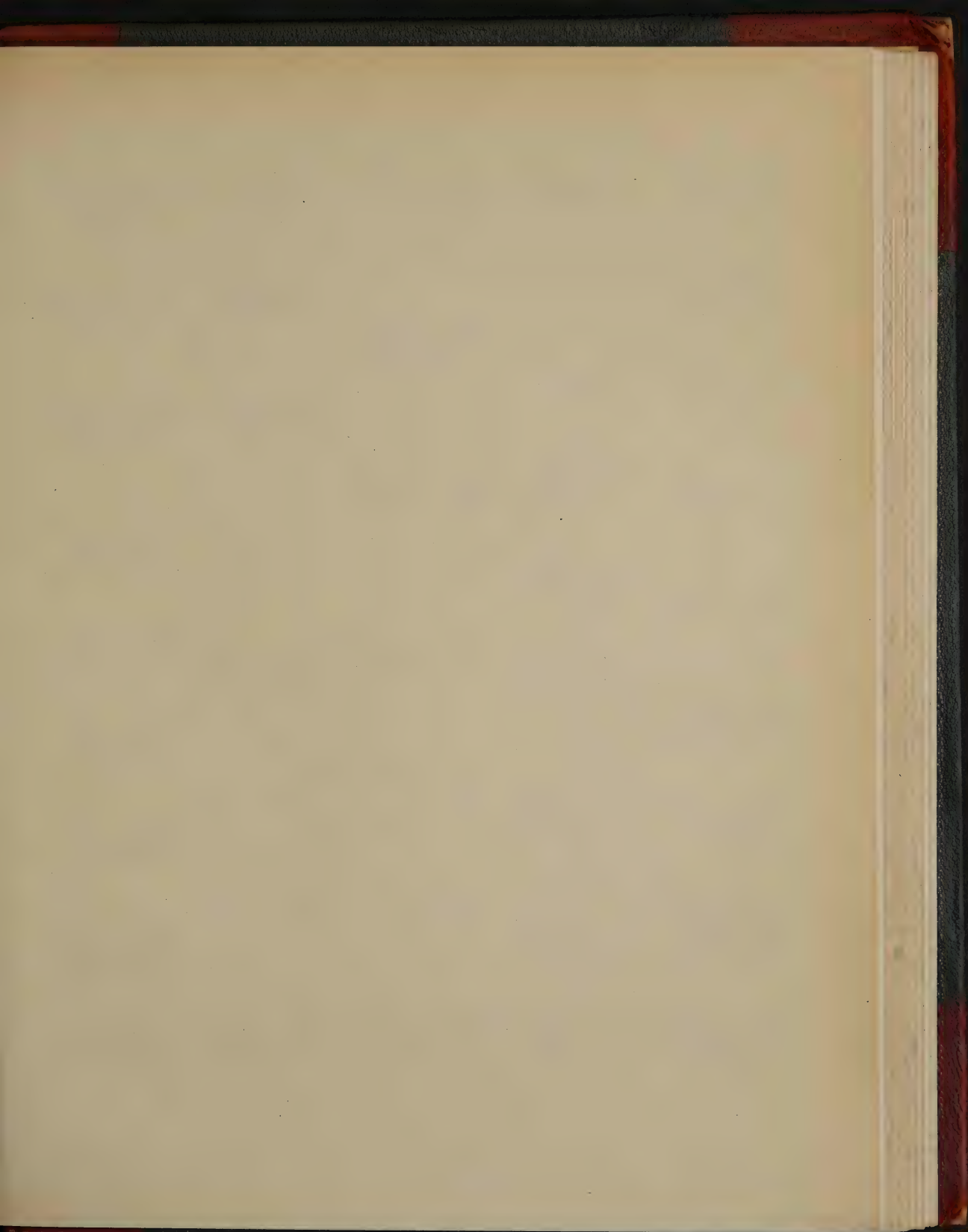


PLATE XIX.

PYRALIDAE.

FIG.		PAGE
1.	Sporophyla oenospora ♂	156
2.	Crocydopora cinigerella	156
3.	Orocrambus subitus ♂	159
4.	" " ♀	
5.	Crambus heliotes ♀	161
6.	" " ♂	
7.	" heteranthes ♂	161
8.	" melitastes ♂	162
9.	" " ♀	
10.	Diptychophora chrysochryta ♂	173
11.	" pyrsophanes ♂	173
12.	" microdora ♀	173
13.	" interrupta ♂	173
14-15.	" lepidella ♀ varieties	174
16-17.	" leucoxantha ♂ varieties	174
18.	Musotima nitidalis ♂ (Frontispiece, fig. 22, egg.)	177
19.	" aduncalis ♀	177
20.	" " ♂	
21.	Meliphora grisella ♀	157
22.	Nymphula nitens ♂	177
23.	Crambus antimorus ♂	161
24.	" sophistes ♂	169
25.	Proteroea comastis ♂	182
26.	Diasemia grammalis ♀	178
27.	Scoparia triclora ♀	184
28.	" chlamydota ♂	184
29.	Heliothela erebopsis ♀	182
30.	Diptychophora selenaca ♂	174
31.	" elaina ♀	176
32-33.	" metallifera varieties ♀ (Plate III., fig. 1, larva.)	174
34.	Scenoploca petraula ♂	172
35.	Argyria strophaca ♀	170
36.	Diptychophora holanthes ♀	175
37.	" auriscriptella ♀	175
38.	" harmonica ♀	175
39.	" helioctypa ♀	175
40.	" epiphaca ♂	176
41.	Tauroscopa trapezitis ♂	171
42.	" gorgopis ♀	171

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



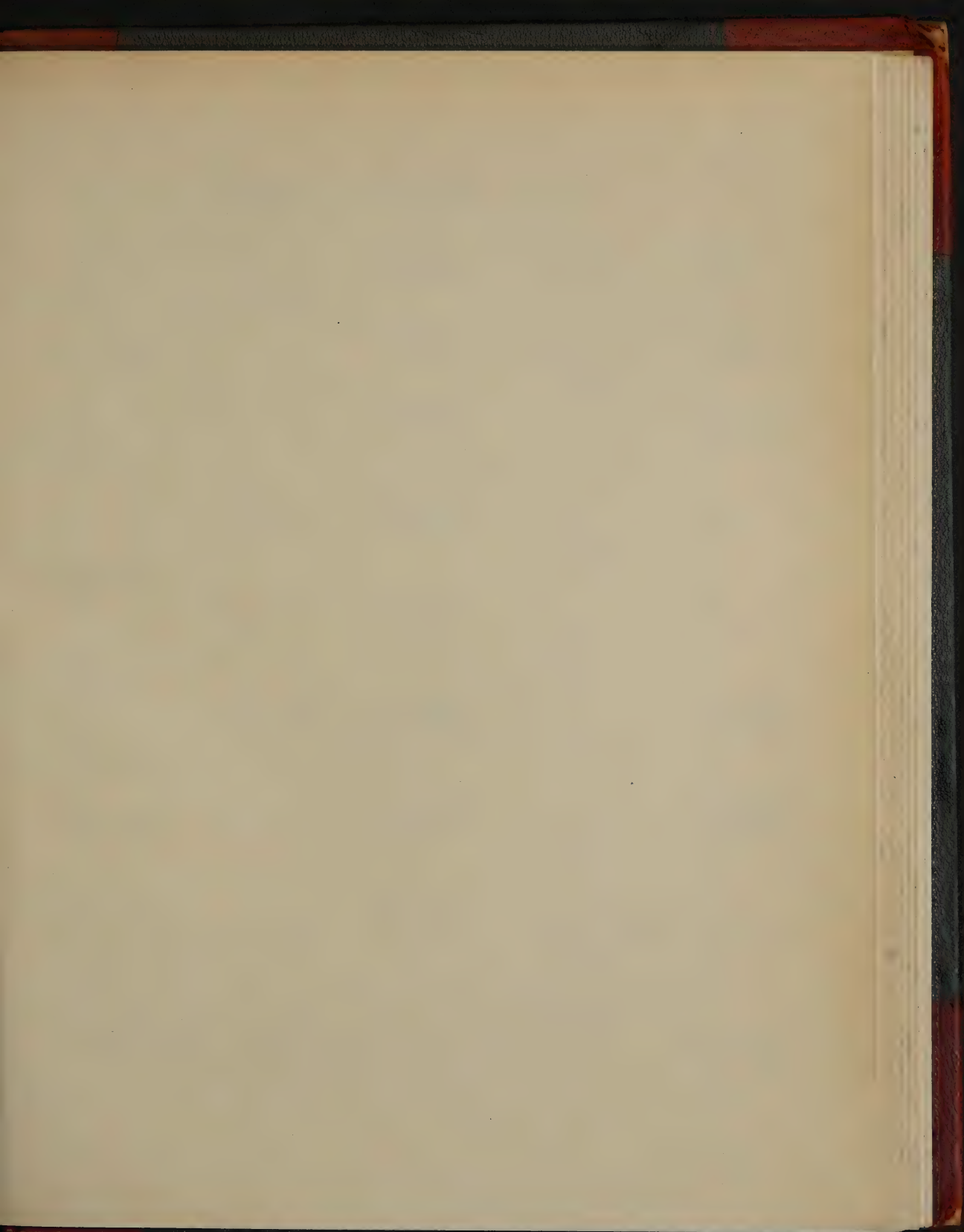


PLATE XX.

PYRALIDAE.

FIG.		PAGE
1.	<i>Crambus corruptus</i> ♂	161
2-4.	" <i>vittellus</i> varieties	167
5.	" <i>obstructus</i> ♂	167
6.	" <i>xanthogrammus</i> ♂	170
7.	" <i>haplotomus</i> ♂	165
8.	" <i>tuhualis</i> ♂	168
9.	" <i>ereneus</i> ♀	165
10.	" <i>isochytus</i> ♂	164
11.	<i>Homocosoma vagella</i> ♂	157
12.	<i>Scoparia illota</i> ♂	196
13.	<i>Crambus apselias</i> ♂	162
14.	" <i>simplex</i> ♂ (Plate II., fig. 34, larva, 35, pupa.)	166
15.	" " ♀	
16.	" <i>enchophorus</i> ♀	165
17.	" <i>paraxenus</i> ♂	167
18.	" <i>dierenellus</i> ♀	164
19.	" <i>diploirrhous</i> ♀	164
20.	" <i>apicellus</i> ♂	167
21.	<i>Orocerambus thymiaestes</i> ♂	159
22.	" <i>machaeristes</i> ♀	160
23.	" <i>mylites</i> ♀	158
24.	" <i>pervius</i> ♂	159
25.	" <i>catacaustus</i> ♂	159
26.	" <i>melampetrus</i> ♀	158
27.	" <i>tritonellus</i> ♂	160
28.	<i>Crambus siriellus</i> ♂	166
29-30.	" <i>ramosellus</i> varieties	163
31.	" <i>flexuosellus</i> ♂ (Frontispiece, fig. 24, egg.)	168
32.	" <i>pedias</i> ♂	166
33.	" <i>schedias</i> ♂	166
34.	" <i>callirrhous</i> ♀	165
35.	" <i>oncobolus</i> ♀	169
36.	" <i>harpophorus</i> ♂	169
37.	" <i>heteraulus</i> ♀	164
38.	" <i>angustipennis</i> ♀	163
39.	" <i>vulgaris</i> ♀	168
40.	<i>Protyparcha scaphodes</i> ♂	170
41.	<i>Hymenia fascialis</i>	179
42.	<i>Proternia philocapna</i> ♂	179
43.	<i>Crambus sophronellus</i> ♂	169
44.	" <i>cyclopius</i> ♀	169
45.	<i>Tauroscopa glaucophanes</i> ♂	171
46.	" " ♀ (Plate XLVIII., fig. 5.)	
47.	<i>Scelodes cordalis</i> ♀ (Plate II., fig. 39, larva.)	178
48.	<i>Argyria pentadactyla</i> ♂	170

All the figures are slightly less than the natural size.



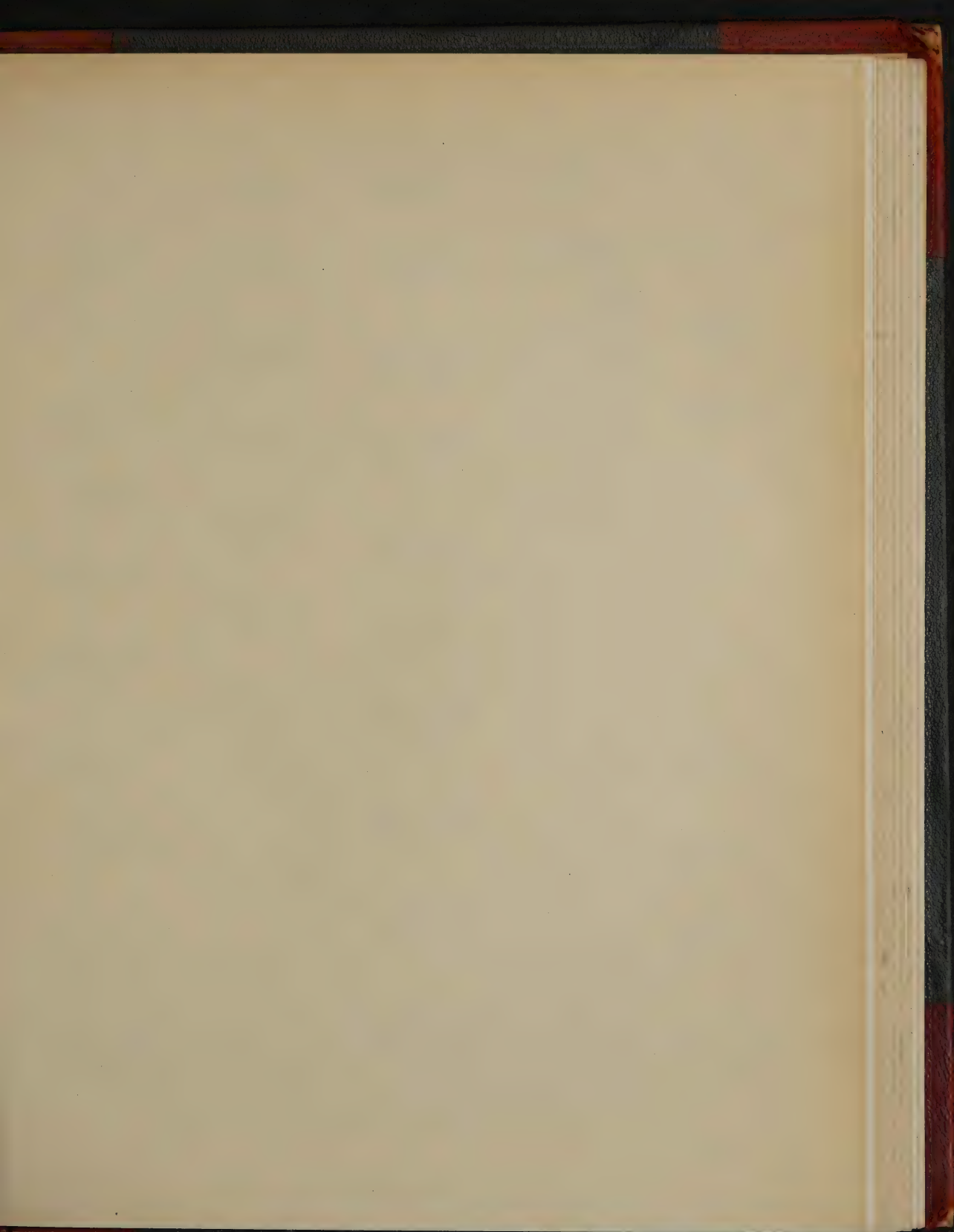


PLATE XXI.

PYRALIDAE.

FIG.		PAGE
1.	<i>Scoparia colpota</i> ♂	191
2.	" <i>choristis</i> ♀	191
3.	" <i>periphanes</i> ♀	191
4.	" <i>triseelis</i> ♀	191
5.	" <i>xysmatias</i> ♂	187
6.	" <i>phalerias</i> ♀	192
7-9.	" <i>submarginalis</i> , varieties	192
10.	" <i>indistinctalis</i> ♂	193
11.	" <i>petrina</i> , variety. (See also fig. 22.)	199
12.	" <i>philerga</i> ♀	183
13.	" <i>parmifera</i> ♂	186
14.	" <i>acharis</i> ♀	186
15.	" <i>locularis</i> ♂	190
16.	" <i>autochroa</i> ♀	188
17.	" <i>asaleuta</i> ♂	193
18.	" <i>gyrotoma</i> ♂	193
19.	" <i>cataxesta</i> ♂	193
20.	" <i>diphtheralis</i> ♂	192
21.	" <i>tetracycla</i> ♀	193
22.	" <i>petrina</i> , variety. (See fig. 11.)	199
23.	<i>Mecyna daiclealis</i> . (Plate II., fig. 37, larva.)	180
24.	" <i>adversa</i> ♂	181
25.	" <i>maorialis</i> ♂ (Plate II., fig. 38, larva.)	180
26.	" <i>marmarina</i> ♂	181
27-28.	" <i>flavidalis</i> , varieties	181
29.	" <i>pantheropa</i> ♂	181
30.	<i>Nesarcha hybrealis</i> ♂	179
31.	" " ♀	
32.	<i>Scoparia vulpecula</i> ♀	195
33.	" <i>epicomia</i> ♀	195
34.	" <i>feredayi</i> ♂	195
35.	<i>Talis leucophthalma</i> ♂	172
36.	<i>Scoparia paltomacha</i> ♂	197
37.	" " ♀	
38.	" <i>sabulosella</i> ♂	198
39.	" <i>deltophora</i> ♀	197
40.	" <i>elavata</i> ♀	198
41.	" <i>rotuella</i> ♂	200
42.	" <i>trivirgata</i> ♂	198
43.	" <i>panopla</i> ♂	198
44.	" <i>exilis</i> ♀	197
45.	" <i>bisinalis</i> ♀	194
46.	" <i>galactalis</i> ♂	190
47.	" <i>asterisea</i> ♀	204
48.	" <i>luminatrix</i> ♂	203
49.	" <i>legnota</i> ♂	203
50.	" <i>trapezophora</i> ♂	190
51.	" <i>melanaegis</i> ♀	190
52.	" <i>ejuneida</i> ♀	201
53.	" <i>dryphaetis</i> ♀	200
54.	" <i>cyameuta</i> ♀	199

Except fig. 32 all the figures are slightly less than the natural size.



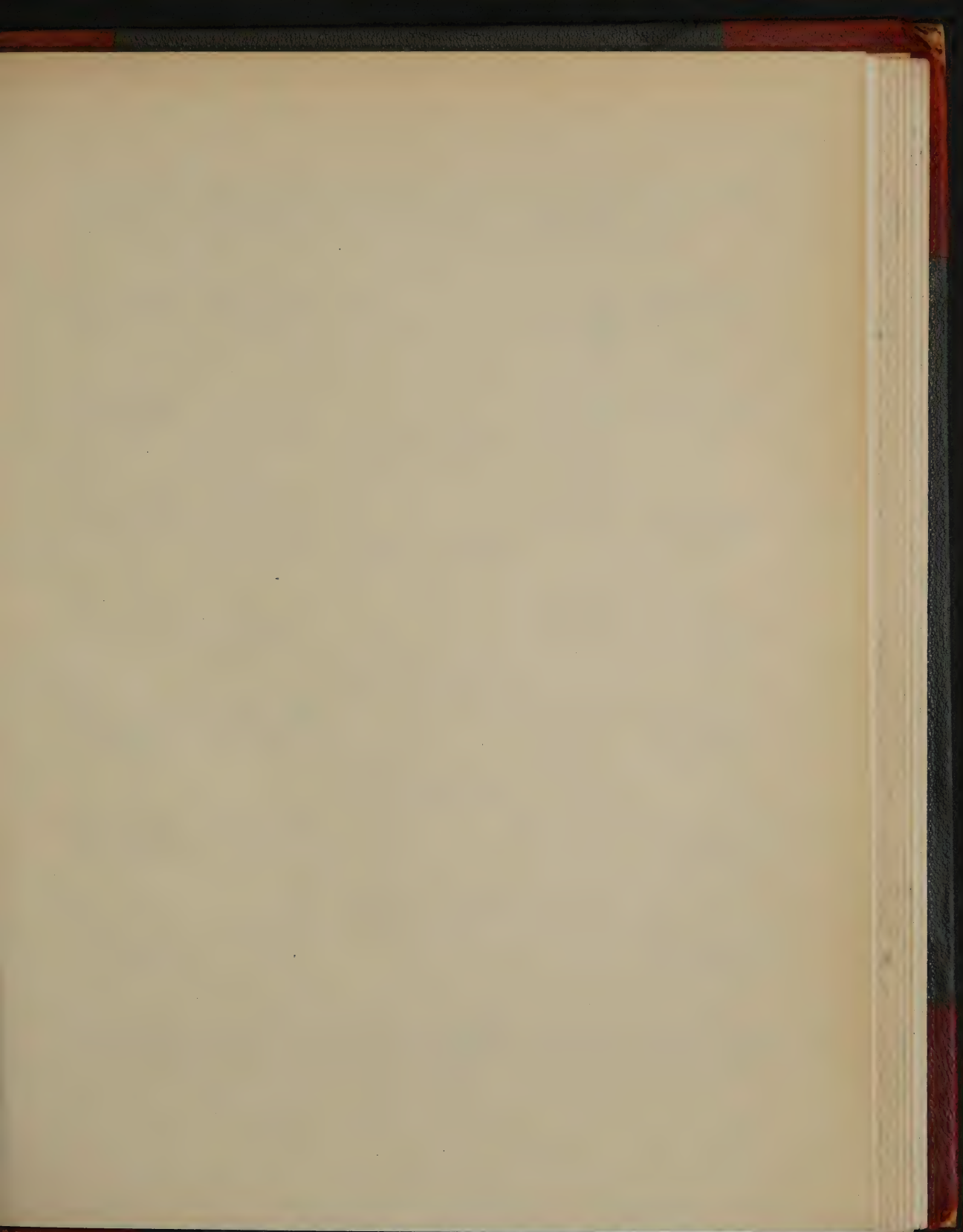


PLATE XXII.

FIG.		PYRALIDAE.	PAGE
1.	<i>Scoparia pongalis</i>	♀	189
2.	"	<i>dochmia</i> ♂	184
3.	"	<i>dinodes</i> ♀	185
4.	"	<i>characta</i> ♀	189
5.	"	<i>elaphra</i> ♀	197
6.	"	<i>encapna</i> ♀	188
7.	"	<i>hemicycla</i> ♀	187
8.	"	<i>steropaea</i> ♂	197
9.	"	<i>erypsinoa</i> ♂	196
10.	"	<i>parachalea</i> ♀	202
11.	"	<i>hemiplaea</i> ♀	184
12.	"	<i>meliturga</i> ♂	183
13.	"	<i>chalicodes</i> ♀	194
27.	"	<i>organaca</i> ♂	202
28.	"	<i>ergatis</i> ♂	188
29.	<i>Gadira acerella</i>	♀	176
30.	<i>Scoparia cyptastis</i>	♂	195
36.	"	<i>thyridias</i> ♀	183
37.	"	<i>minuialis</i> ♀	185
38.	"	<i>minuseulalis</i> ♀	184
39.	"	<i>ustimacula</i> ♂	189
40.	"	<i>cymatias</i> ♀	187
41.	"	<i>leucogramma</i> ♀	204
42.	"	<i>critica</i> ♂	189
43.	"	<i>chimeria</i> ♀ (Plate II, fig. 36, larva.)	185
44.	<i>Diplopestus perieralis</i>	♂	205
TORTRICIDAE.			
14.	<i>Proselena niphostrota</i>	♀	219
15-17.	<i>Catamacta gavisana</i>	♂ varieties	220
18.	"	♀ variety. (See also figs. 34 and 35.)	
19.	<i>Carposina cryodana</i>	♂	217
20.	"	<i>charaxias</i> ♀	217
21.	"	<i>contactella</i> ♀	215
22.	"	<i>adrectella</i> ♂	216
23.	"	<i>gonosemana</i> ♀	217
24.	"	<i>iophaea</i> ♂	216
25-26.	"	<i>thalamota</i> , varieties	216
31.	<i>Pyrgotis eudorana</i>	♂	219
34, 35.	<i>Catamacta gavisana</i>	♀ varieties. (See fig. 18.)	220
TINEIDAE.			
32.	<i>Izatha heroica</i>	♂	278
33.	"	♀	

Except figures 32 and 33, all the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



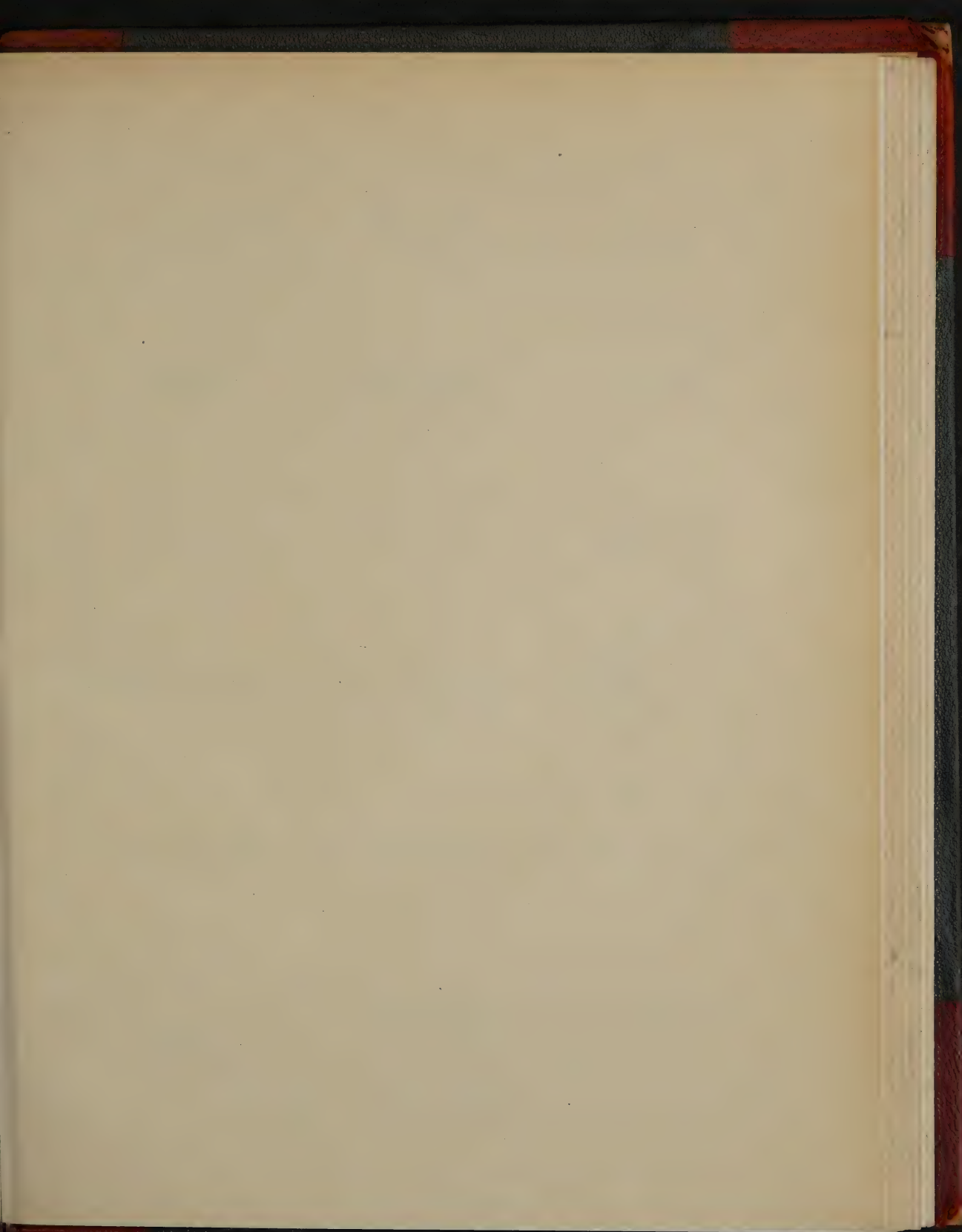
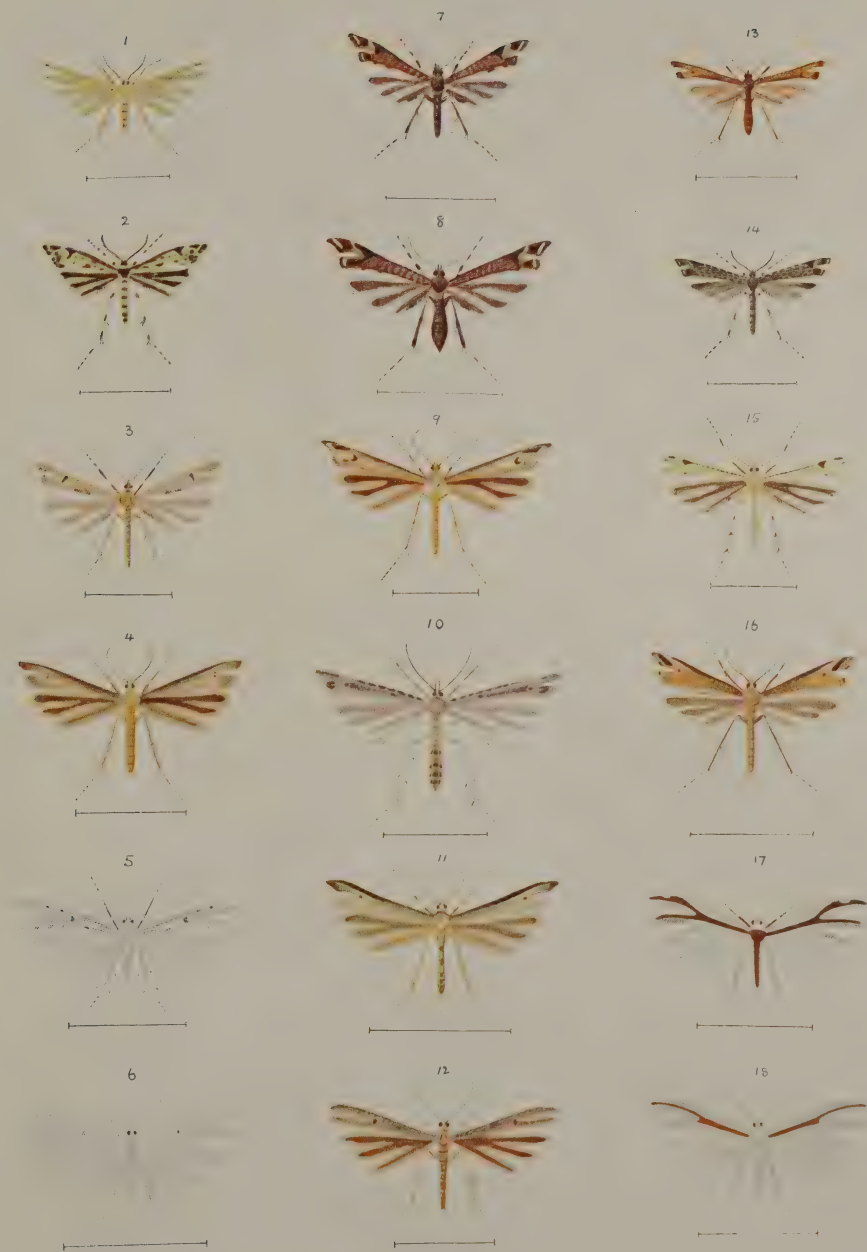


PLATE XXIII.

PTEROPHORIDAE.

FIG.		PAGE
1.	<i>Alucita innotatalis</i> ♂ (Frontispiece, fig. 21, egg.)	210
2.	<i>Platyptilia deprivalis</i> ♂	208
3.	<i>Stenoptilia eclidota</i> ♂	209
4.	„ <i>charadrias</i> ♂	211
5.	<i>Alucita monospilalis</i> ♂	209
6.	„ „ ♀ (Plate II, fig. 29, larva; 28, pupa.)	
7.	<i>Platyptilia falcatalis</i> ♂	207
8.	„ „ ♀	
9.	<i>Stenoptilia vigens</i> ♂	211
10.	„ <i>orites</i> ♀	211
11.	„ <i>lithoxesta</i> ♀	210
12.	„ <i>zophodaetyla</i> ♂	211
13.	<i>Platyptilia heliastis</i> ♀	208
14.	„ <i>aeolodes</i> ♀	207
15.	„ <i>campsiptera</i> ♀	208
16.	<i>Stenoptilia epotis</i> ♀	210
17.	<i>Alucita fureatalis</i> ♀ (Frontispiece, fig. 25, egg.)	210
18.	„ <i>lycosema</i> ♀	209

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



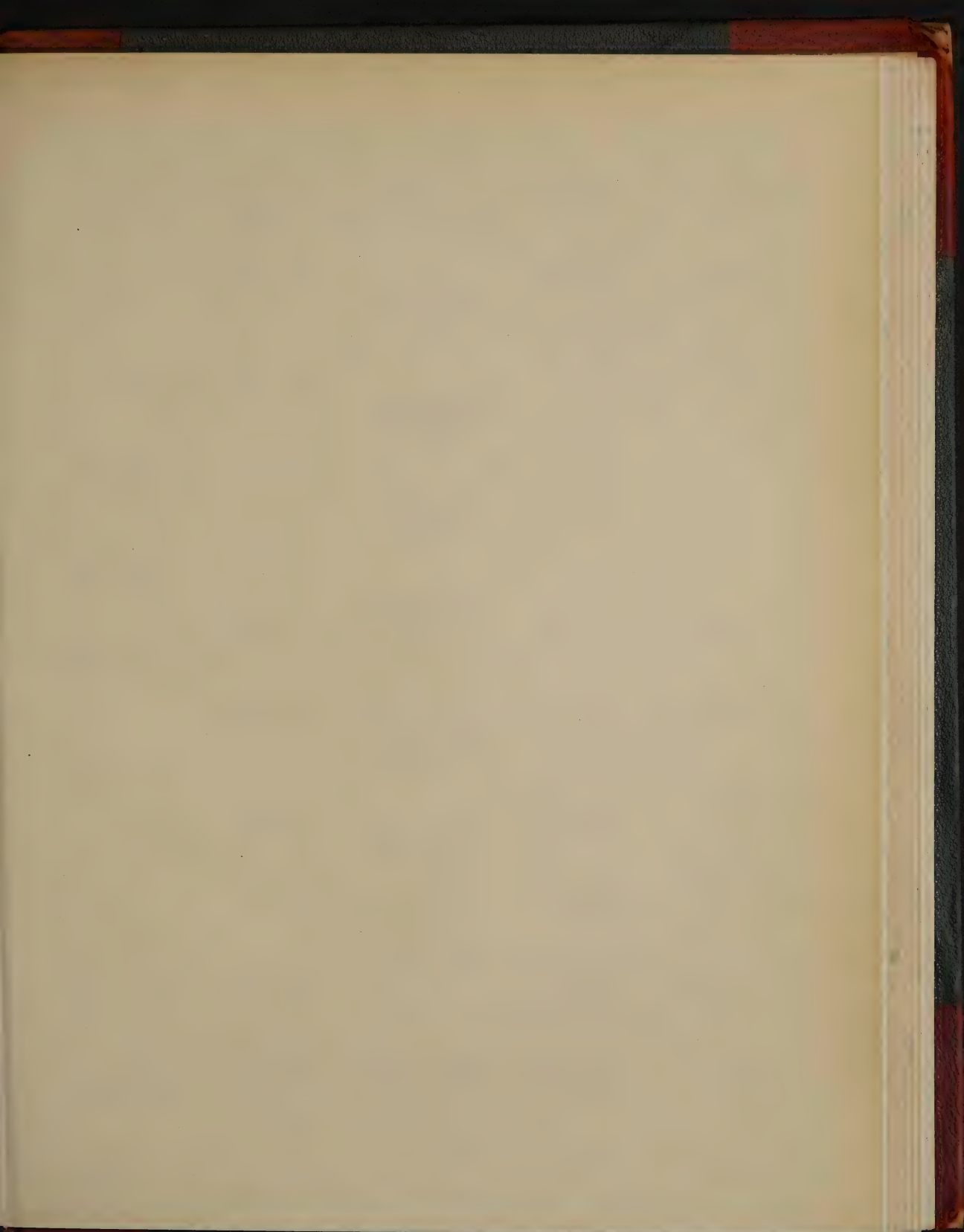


PLATE XXIV.

FIG.		PYRALIDAE.						PAGE
8.	Scoparia	augastis	♀	.....	.....	.....	.....	199
9.	"	niphospora	♂	.....	.....	.....	.....	201
10.	"	aspidota	♀	.....	.....	.....	.....	201
21.	"	octophora	♀	.....	.....	.....	.....	203
22.	Clepsicosma	iridia	♂	.....	.....	.....	.....	204
23.	Pyralis	farinalis	♀	.....	.....	.....	.....	205
24.	Scoparia	sideraspis	♀	.....	.....	.....	.....	202
39.	"	pura	♂	.....	.....	.....	.....	202
40.	"	"	♀	.....	.....	.....	.....	.....
41.	"	chalara	♂	.....	.....	.....	.....	204
49.	"	astragalota	♂	.....	.....	.....	.....	200
50.	"	halopis	♂	.....	.....	.....	.....	199
51.	"	psammittis	♂	.....	.....	.....	.....	194
THYRIDIDAE.								
25.	Morova	subfasciata	♂	.....	.....	.....	.....	206
26.	"	"	♀	.....	.....	.....	.....	.....
TORTRICIDAE.								
1.	Tortrix	orthocopa	♂	.....	.....	.....	.....	229
2.	Harmologa	amplexana	♂ (Plate III., fig. 3, larva.)	.....	.....	.....	.....	239
3.	"	"	♀	.....	.....	.....	.....	.....
4.	"	scoliastis	♀	.....	.....	.....	.....	240
5-6.	Tortrix	excessana	varieties. (Frontispiece, fig. 27, eggs. See also figs. 27-30.)	.....	.....	.....	.....	230
7.	Carposina	exochana	♂	.....	.....	.....	.....	217
11.	Tortrix	orthropis	♂ (dark southern variety.)	.....	.....	.....	.....	228
12.	Pyrgotis	pyramidias	♀	.....	.....	.....	.....	219
13-14.	Capua	plagiata	♂ varieties	.....	.....	.....	.....	222
15-17.	"	"	♀	.....	.....	.....	.....	.....
18-19.	"	"	Auckland Island form	.....	.....	.....	.....	.....
20.	Carposina	morbida	♀	.....	.....	.....	.....	218
27-30.	Tortrix	excessana	varieties. (See also figs. 5 and 6.)	.....	.....	.....	.....	230
31-32.	"	orthropis	♂ varieties	.....	.....	.....	.....	228
33-35.	"	charactana	varieties. (Plate III., fig. 17, larva.)	.....	.....	.....	.....	227
36.	"	postvittana	♂	.....	.....	.....	.....	228
37.	"	demiana	♂	.....	.....	.....	.....	226
38.	Aseerodes	prochlora	♂	.....	.....	.....	.....	225
42-44.	Tortrix	conditana	varieties	.....	.....	.....	.....	229
45.	Capua	plagiata	variety	.....	.....	.....	.....	222
46.	Tortrix	syntona	♀	.....	.....	.....	.....	229
47-48.	"	pictoriana	varieties	.....	.....	.....	.....	226
52.	Carposina	eriphylla	♀ (Plate I., fig. 19, larva.)	.....	.....	.....	.....	217

All the figures are slightly less than the natural size.



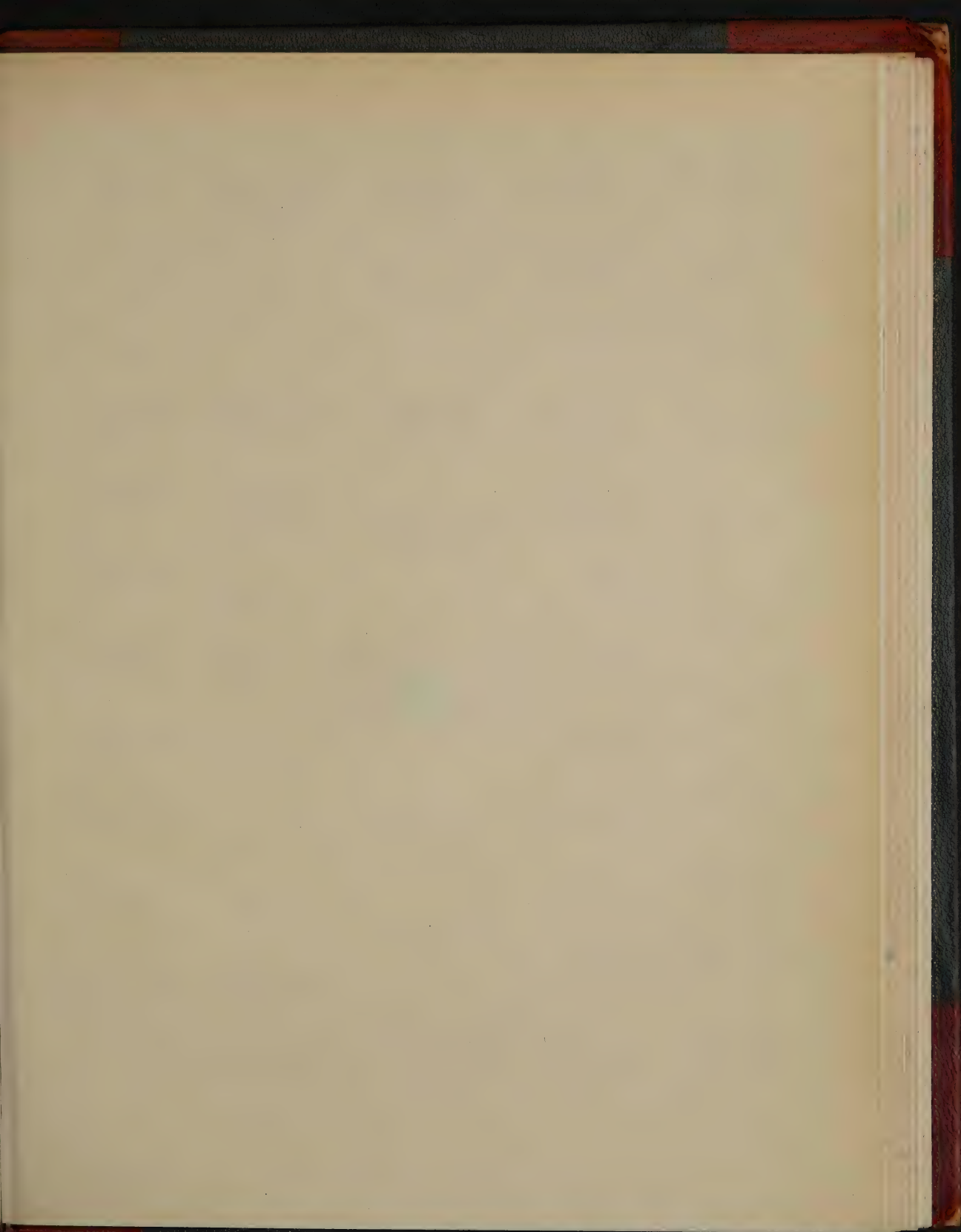


PLATE XXV.

TORTRICIDAE.

FIG.		PAGE
1.	<i>Tortrix flavescens</i> ♂	231
2.	" " ♀	
3-6.	<i>Ctenopseustis obliquana</i> ♂ varieties	234
7-10.	" " ♀ varieties	
13.	<i>Gelophaula siraea</i> ♂	236
14.	" " ♀	
15.	" <i>trisulca</i> ♂	235
16.	" " ♀	
17.	<i>Cnephasia jactatana</i> ♂	242
18.	" " ♀	
19.	" <i>incessana</i> ♀	242
32.	<i>Harmologa pontifica</i> ♂	240
33.	<i>Ochetarcha miraculosa</i> variety. (See Plate XLV., fig. 9.)	244
34.	<i>Gelophaula tributaria</i> ♂	236
35.	" <i>palliat</i> ♂ (Plate XLIV., fig. 25, ♀.)	235
36.	<i>Eucosma querula</i> ♂	247
37.	" " ♀	
38.	<i>Laspeyresia pomonella</i>	249
44-45.	<i>Epalxiphora axenana</i> ♂ varieties	233
46-53.	" " ♀ varieties	

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11.	<i>Agriophara coricopa</i> variety ♂	296
12.	" " ordinary form ♀ (Plate III., fig. 15, larva.)	
20.	<i>Nymphostola galactina</i> ♂ (Frontispiece, fig. 29, egg.)	291
21.	<i>Cryptolechia apocrypta</i>	294
22.	" <i>lioehroa</i> ♀	294
23.	" " ♂	
24.	<i>Izatha epiphanes</i> ♀	281
25.	" <i>caustopa</i> ♀	280
26.	" <i>copiosella</i> ♂	280
27.	" " ♀	
28.	<i>Titanomis sisyrota</i> ♀	351
29.	<i>Izatha aemonias</i> ♂	279
30.	" <i>attaetella</i> ♂	280
31.	" " ♀	
39.	" <i>picarella</i> ♀	279
40.	<i>Atomotricha isogama</i>	288
41.	" <i>exsomnia</i> ♂	288
42.	<i>Proteodes profunda</i> ♀	293
43.	<i>Izatha huttoni</i> ♂	278
54.	" <i>peroneanella</i> ♂ (Plate III., fig. 6, larva.)	278

All the figures are slightly less than the natural size.



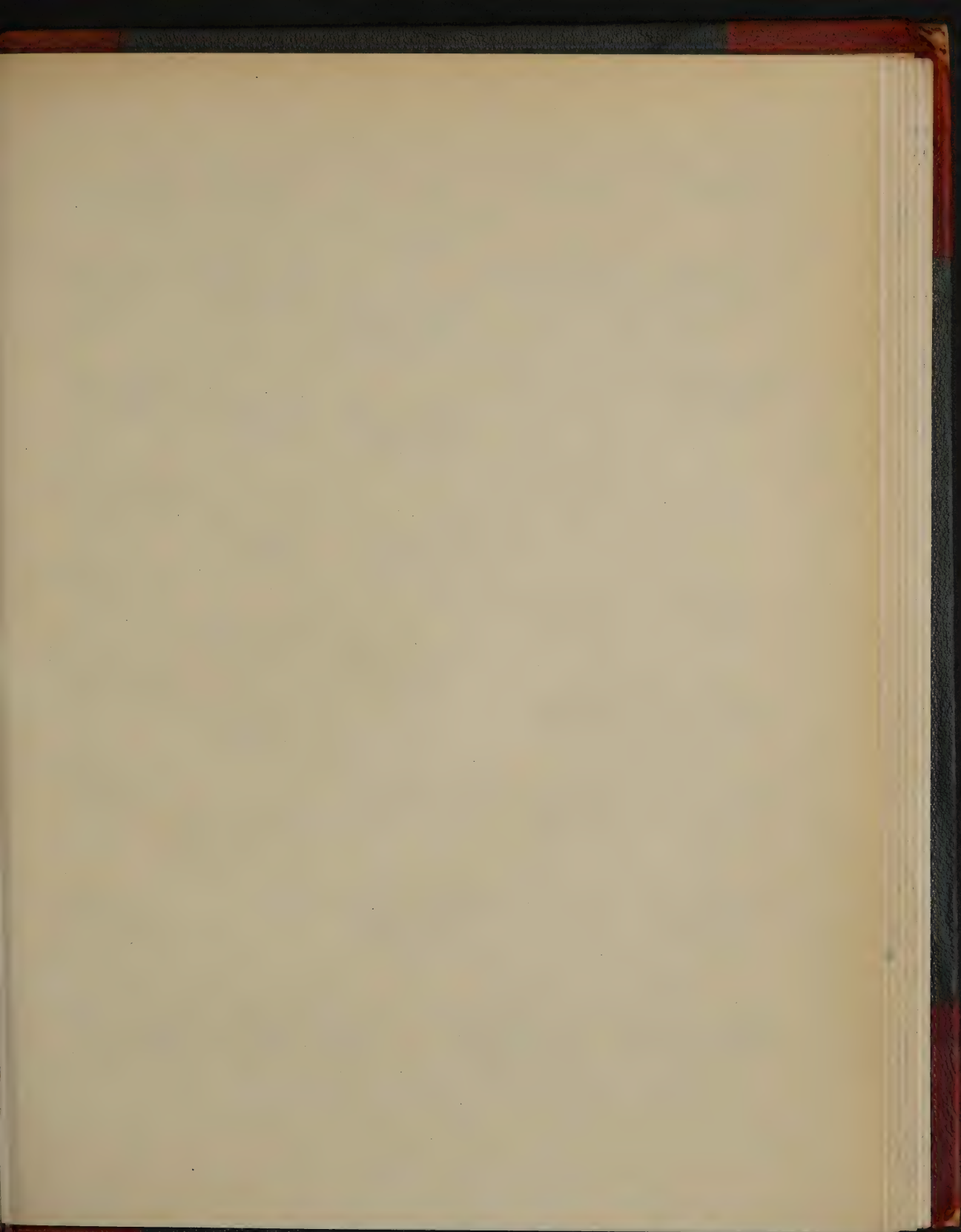


PLATE XXVI.

TORTRICIDAE.

FIG.		PAGE
1.	<i>Tortrix fervida</i> ♂	231
2.	" " ♀	
3.	" <i>molybditis</i> ♂ (Plate III., fig. 4, larva in case; fig. 5 ditto withdrawn from case.)	231
4.	<i>Capua plinthoglypta</i> ♂	223
5-6.	" <i>semiferana</i> ♂ varieties	223
7.	" " ♀	
8.	<i>Tortrix indigestana</i> ♂	227
9.	<i>Bactra noteraula</i> ♂	248
10.	<i>Eurytheeta zelaea</i> ♂	224
11.	" <i>potamias</i> ♂	224
12.	" " ♀	
13.	" <i>paraloxa</i> ♀	225
14.	<i>Ecclitica hemictista</i> ♀	242
15.	<i>Epichorista emphanes</i> ♂; figs. 30, 31 ♀	238
16.	<i>Harmoloba oblongana</i> ♂	239
17.	" <i>sisyrana</i> ♀	240
18.	<i>Bactra xystrota</i> ♀	249
19.	<i>Epichorista persecta</i> var. <i>semicocta</i> ♂ (See Plate XLV., figs. 20, 21.)	237
20.	" <i>allogama</i> ♂	238
21.	" " ♀	
22.	<i>Eurytheeta loxias</i> ♀	225
23.	" <i>robusta</i> ♂	224
24.	<i>Epichorista crypsidora</i> ♂	239
25.	" " ♀	
26.	<i>Argyroplote chlorosaris</i> ♂	249
27.	<i>Tortrix torogramma</i> ♂	228
28.	<i>Capua cyclobathra</i> ♂	222
29.	<i>Tortrix leucaniana</i> ♀	226
30, 31.	<i>Epichorista emphanes</i> ♀ varieties; fig. 15 ♂. (See also Plate XLV., fig. 12.)	238
32.	" <i>aspistana</i> ♂	237
33.	" <i>hemionana</i> ♂	236
34.	" <i>siriana</i> ♂	237
35.	<i>Spilonota chaophila</i> ♂	246
36.	" " ♀	
37.	<i>Cnephasia latomana</i> ♂	243
38.	" " ♀	
39.	" <i>microbathra</i> ♀	244
40-42.	" <i>imbriferana</i> varieties. (Plate III., fig. 2, larva.)	243
43.	<i>Phycomorpha metachrysa</i> ♂	296

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



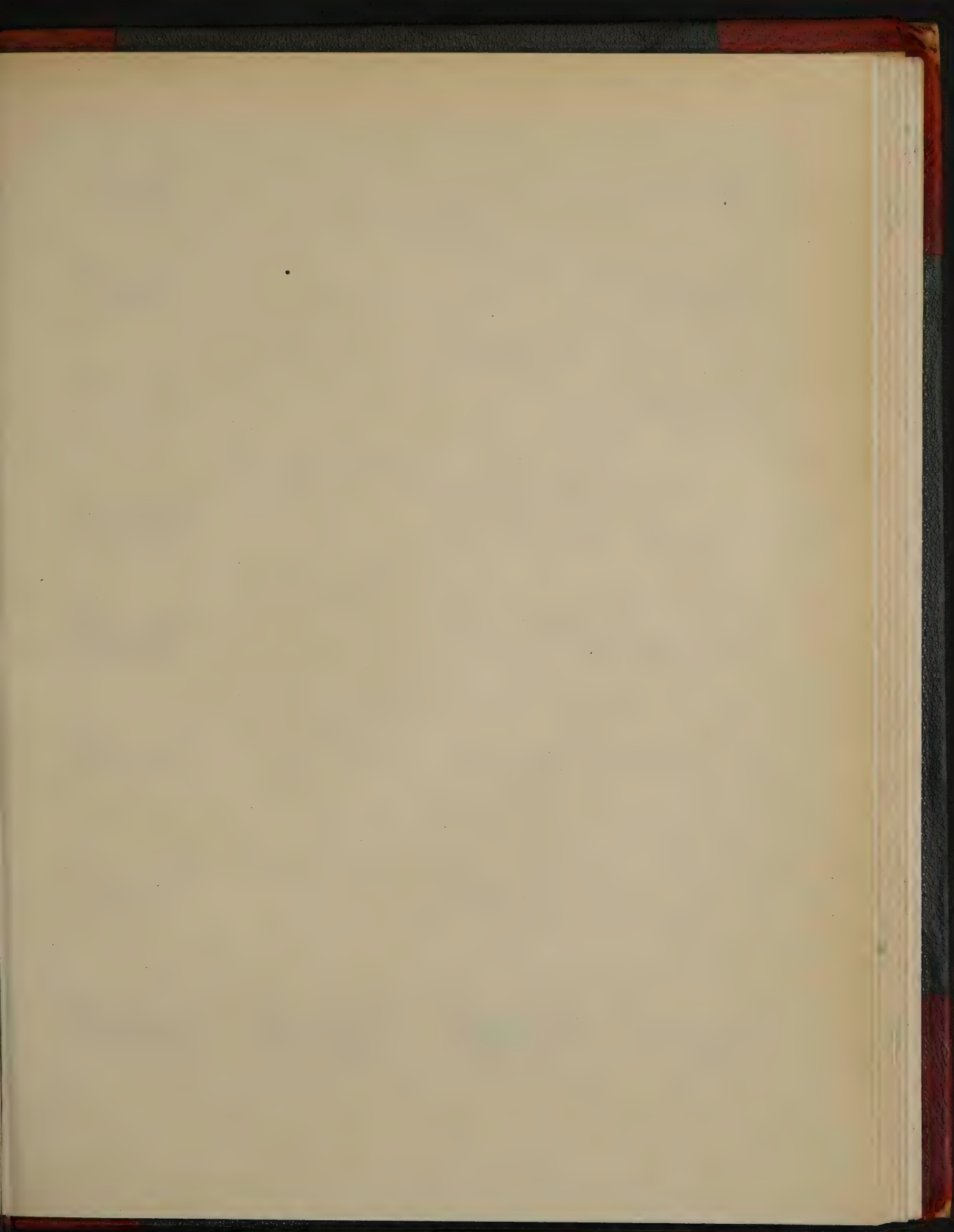


PLATE XXVII.

FIG.		TORTRICIDAE.	PAGE
1, 2.	<i>Spilonota ejectana</i> varieties	.....	246
3.	<i>Gelophaula tritochlora</i> ♀	.....	235
4.	<i>Cnephasia holorphna</i> ♂	.....	243
5.	" <i>petrias</i> ♂	.....	243
6.	<i>Eurythecta trimaculata</i> ♂	.....	224
7.	" " ♀	.....
8.	<i>Harmologa reticularis</i> ♂	.....	241
14.	" <i>sanguinea</i> ♂	.....	240
21.	" <i>festiva</i> ♂	.....	240
22.	<i>Catamaeta rureana</i> ♂	.....	220
23.	" " ♀	.....
24.	" <i>chrysomela</i> ♂	.....	221
25.	<i>Spilonota dolopaea</i> ♂ (Plate XLVII., fig. 5 ♀.)	.....	245
26.	" <i>parthenia</i> ♀	.....	245
27.	" <i>emplasta</i> ♂	.....	246
28.	<i>Carposina maculosa</i> ♂	.....	218
29.	<i>Spilonota zopherana</i> ♂	.....	246
		TINEIDAE.	
9.	<i>Phthorimaea cheradias</i> ♀	.....	255
10.	" <i>thyraula</i> ♀	.....	255
11.	" <i>brontophora</i> ♀	.....	255
12.	<i>Megacraspedus calamogona</i> ♂	.....	252
13.	" " ♀	.....
15.	<i>Aristotelia paradesma</i> ♀	.....	253
16.	<i>Thiotricha thorybodes</i> ♀ (Plate III., fig. 16, larva in case.)	.....	254
17.	" <i>tetraphala</i> ♂	.....	254
18.	<i>Phthorimaea operculella</i> ♂	.....	254
19.	" <i>glaucozyma</i> ♂	.....	256
20.	" <i>hippeis</i> ♂	.....	256

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





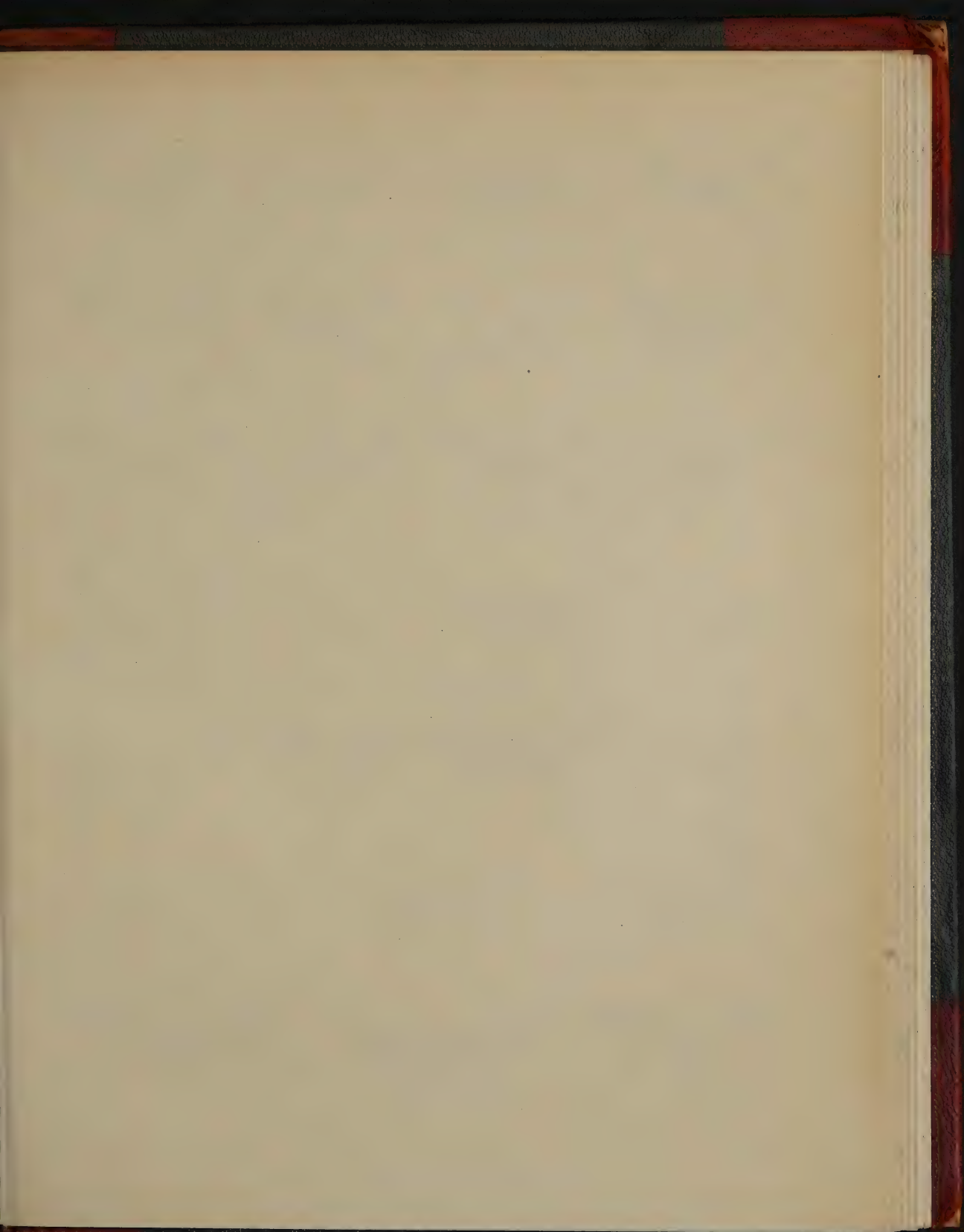


PLATE XXVIII.

TINEIDAE.

FIG.									PAGE
1.	Anisoplaca achyrotia	♀	.....	.....	.....	.....	.....	.....	258
2.	Gelechia lithodes	♂	.....	.....	.....	.....	.....	.....	258
3.	Anisoplaca achrodactyla	♀	.....	.....	.....	.....	.....	.....	258
4.	Gelechia monophragma	♂	.....	.....	.....	.....	.....	.....	257
5.	" "	variety ♂	.....	.....	.....	.....	.....	.....
6.	" parapleura	♂	.....	.....	.....	.....	.....	.....	257
7.	" schematica	♂	.....	.....	.....	.....	.....	.....	257
8.	Microcolona characta	♂	.....	.....	.....	.....	.....	.....	303
9.	Elachista archaenoma	♂	.....	.....	.....	.....	.....	.....	319
10.	" "	♀	.....	.....	.....	.....	.....	.....
11.	" gerasmia	♀	.....	.....	.....	.....	.....	.....	319
12.	Endrosis lacteella	♀	.....	.....	.....	.....	.....	.....	260
13.	Scythris epistrotia	♀	.....	.....	.....	.....	.....	.....	320
14.	Elachista helonoma	♀	.....	.....	.....	.....	.....	.....	319
15.	" exaula	♀ variety.	(See Plate XLVII., fig. 3.)					.....	319
16.	Pyroderces anarithma	♀	.....	.....	.....	.....	.....	.....	302
17.	Schiffermuelleria orthophanes	♂	.....	.....	.....	.....	.....	.....	260
18.	Syntomactis deamatella	♂	.....	.....	.....	.....	.....	.....	303
19.	Circoxena ditrocha	♀	.....	.....	.....	.....	.....	.....	331
20.	Zapyrastra calliphana	♂	.....	.....	.....	.....	.....	.....	302
21.	Phthorimaea melanoplintha	♀	.....	.....	.....	.....	.....	.....	256
22.	Pyroderces apparitella	♂	.....	.....	.....	.....	.....	.....	301
23.	Phthorimaea plenochia	♂	.....	.....	.....	.....	.....	.....	256
24.	" "	♀	.....	.....	.....	.....	.....	.....
25.	Gelechia pharetria	♂	.....	.....	.....	.....	.....	.....	257
26.	" "	♀	.....	.....	.....	.....	.....	.....

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





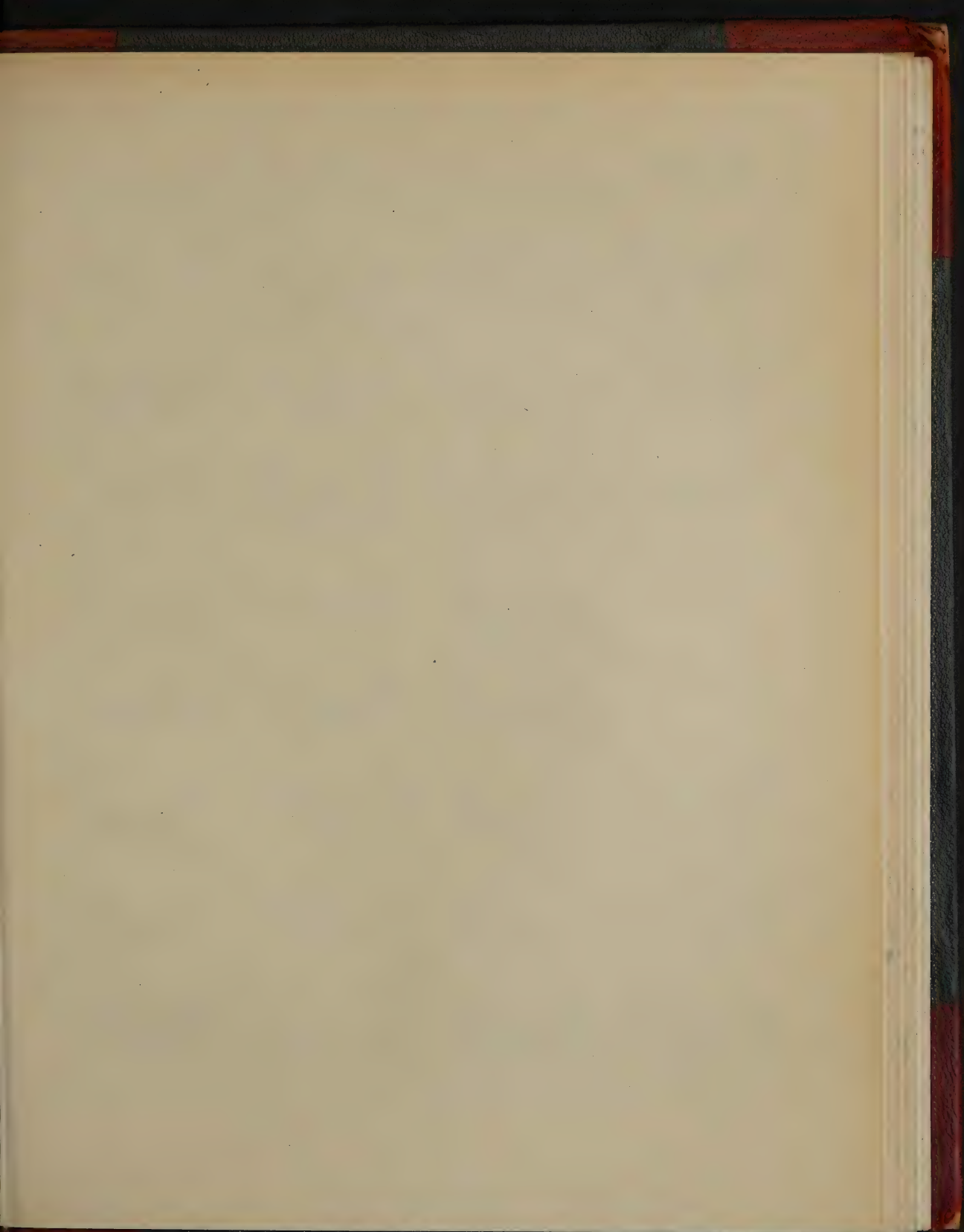


PLATE XXIX.

TINEIDAE.

FIG.																						PAGE
1.	Borkhausenia	maranta	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	263
2.	"	melanamma	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	263
3.	"	loxotis	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	261
4.	"	hoplodesma	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	261
5.	"	compsogramma	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	261
6.	"	chrysogramma	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	261
7.	Locheutis	vagata	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	290
8.	Borkhausenia	xanthomieta	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	262
9.	"	siderodeta	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	262
10.	"	apanthes	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	263
11.	"	armigerella	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	264
12.	"	"	variety	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	269
13.	"	penthalea	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	264
14.	"	perichlora	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	265
15.	"	opaea	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	270
16.	"	seclusa	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	272
17.	Leptocroca	asphaltis	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	271
18.	"	scholaea	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	264
19.	Borkhausenia	apertella	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	269
20.	"	"	variety	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	262
21.	"	imnotella	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	269
22.	"	paratrimma	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	262
23.	"	brachyaema	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	269
24.	"	politis	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	265
25.	"	basella	♂	(Frontispiece, fig. 28, eggs.)																	.....	265
26.	"	"	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	267
27.	"	siderota	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	266
28.	"	pronephela	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	271
29.	"	epimyia	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	274
30.	Gymnobathra	cenchrus	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	266
31.	Borkhausenia	idiogama	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	270
32.	"	hemimochla	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	269
33.	"	annopis	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	268
34.	"	nycteris	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	268
35.	"	"	♀	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	268
36.	"	robinosa	♂	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	268

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



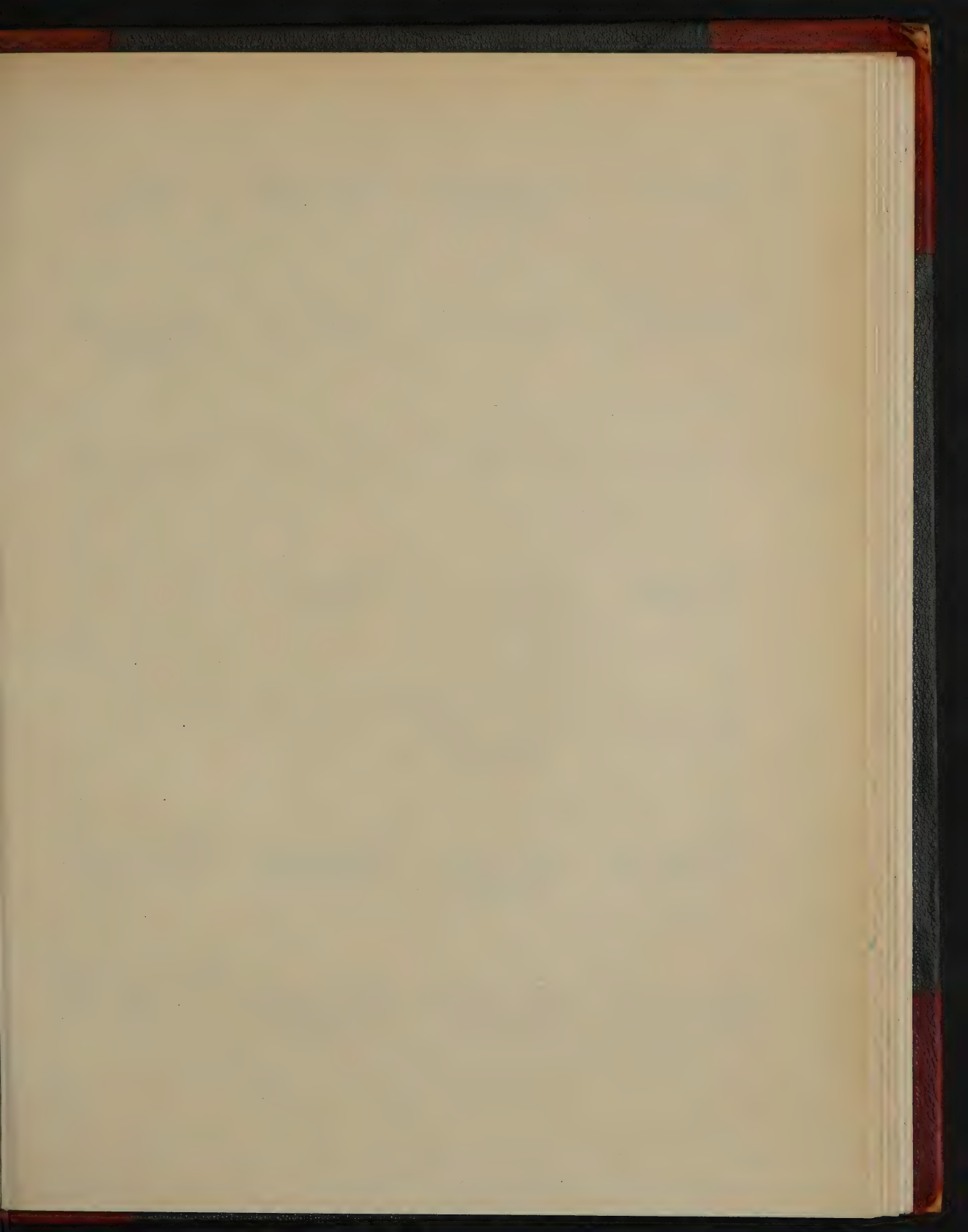


PLATE XXX.

TINEIDAE.

FIG.		PAGE
1.	<i>Gymnobathra pareia</i> ♂ pale variety	276
2.	" " ♂ type	
3.	" <i>tholodella</i> ♂	276
4.	<i>Borkhausenia chloradelpha</i> ♂ (Plate III., fig. 29, larva.)	266
5.	" <i>hastata</i> ♂	266
6.	<i>Trachypepla eumenopa</i> ♂	286
7.	<i>Borkhausenia pseudospirella</i> ♂	271
8.	<i>Izatha manubriata</i> ♂	279
9.	<i>Gymnobathra calliploea</i> ♂	276
10.	" <i>habropis</i> ♂	274
11.	" <i>hyetodes</i> ♂	274
12.	" " ♀	
13.	" <i>squamea</i> ♂	277
14.	<i>Compsistis bifaciella</i> ♀	273
15.	<i>Gymnobathra coarctatella</i> ♀	275
16.	" <i>hamatella</i> ♂	274
17.	" " ♀	
18.	" <i>flavidella</i> ♂ type. (Plate III., fig. 9, larva.)	275
19.	" " ♂ variety	
20.	<i>Izatha metadelta</i> ♂	281
21.	" " ♀	
22.	<i>Gymnobathra bryaula</i> ♂ (Plate III., fig. 7, larva.)	276
23.	" " ♀	
24.	" <i>thetodes</i> ♂	276
25.	" <i>omphalota</i> ♂	277
26.	" " ♀	
27.	<i>Parocystola aeroxantha</i> ♀	290
28.	<i>Thamnosara sublitella</i> ♂	273

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





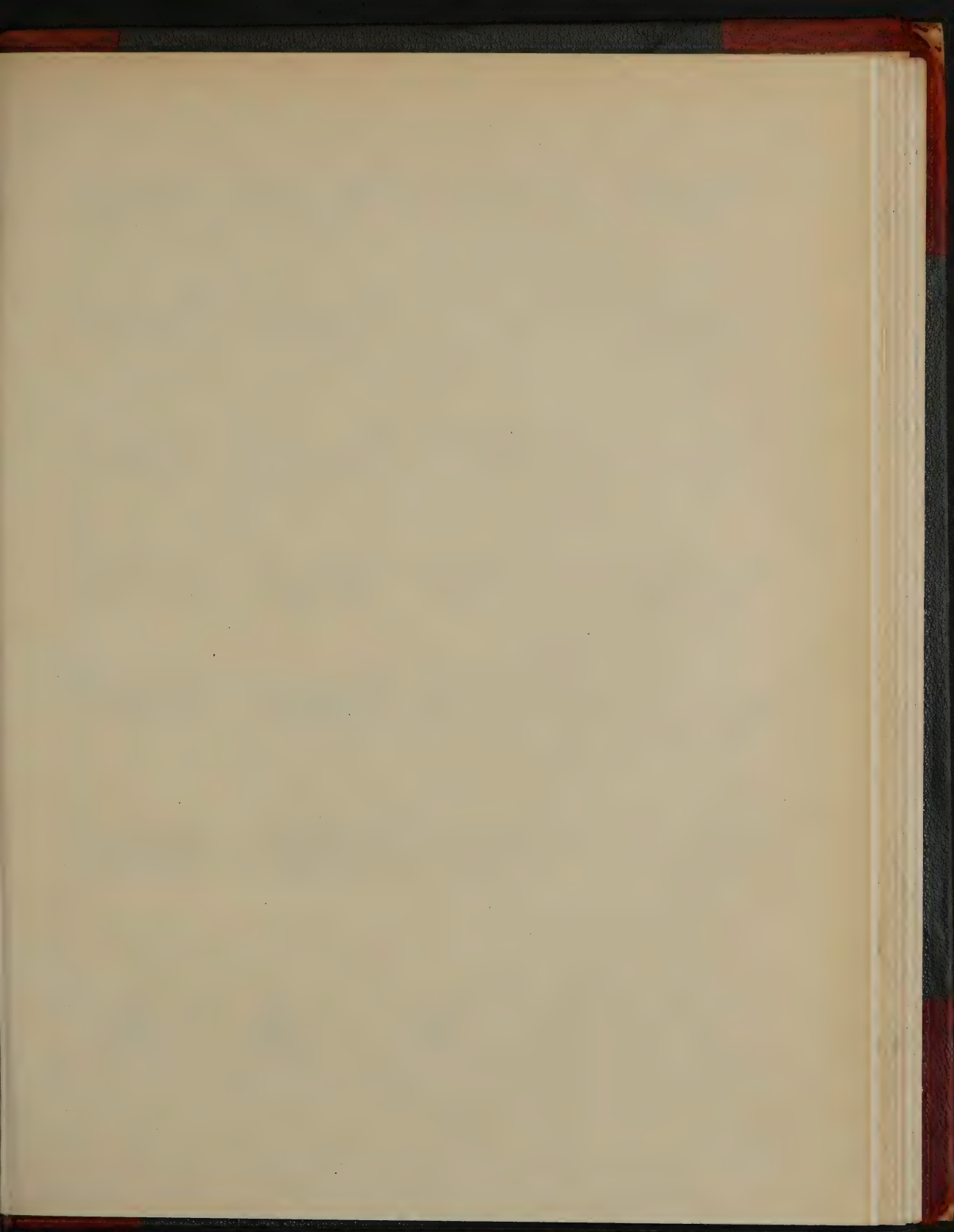


PLATE XXXI.

TINEIDAE.

FIG.		PAGE
1.	<i>Izatha convulsella</i> ♀	282
2.	<i>Trachypepla spartodeta</i> ♀	284
3.	" <i>hieropis</i> ♀	284
4.	" <i>ingenua</i> ♂	284
5.	" <i>contritella</i> ♂	285
6.	<i>Izatha mira</i> ♀	281
7, 14, 21.	<i>Atomotricha versuta</i> ♀ varieties. (See figs. 18, 19, 20.)	287
8.	<i>Trachypepla conspicuella</i> ♀	283
9.	" <i>amphileuca</i> ♀	284
10.	" <i>euryleucota</i> ♂	283
11.	" <i>leucoplanetis</i> ♂	283
12.	" <i>anastrella</i> ♂	286
13.	<i>Euchersadaula lathriopa</i> ♀	273
15.	<i>Atomotricha sordida</i> ♂	288
16.	" <i>oecanoma</i> ♂ (See figs. 22 and 29.)	288
17.	<i>Gelechia lapillosa</i> ♂	258
18-20.	<i>Atomotricha versuta</i> ♂ varieties. (See figs. 7, 14 and 21.)	287
23.	<i>Trachypepla protochlora</i> ♀	285
24.	" <i>aspidephora</i> ♀	285
25, 26.	" <i>lichenodes</i> ♀ varieties	286
27.	<i>Izatha phaeoptila</i> ♂	282
28.	<i>Trachypepla galaxias</i> ♀	284
22, 29.	<i>Atomotricha oecanoma</i> ♀ varieties. (See fig. 16.)	288

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





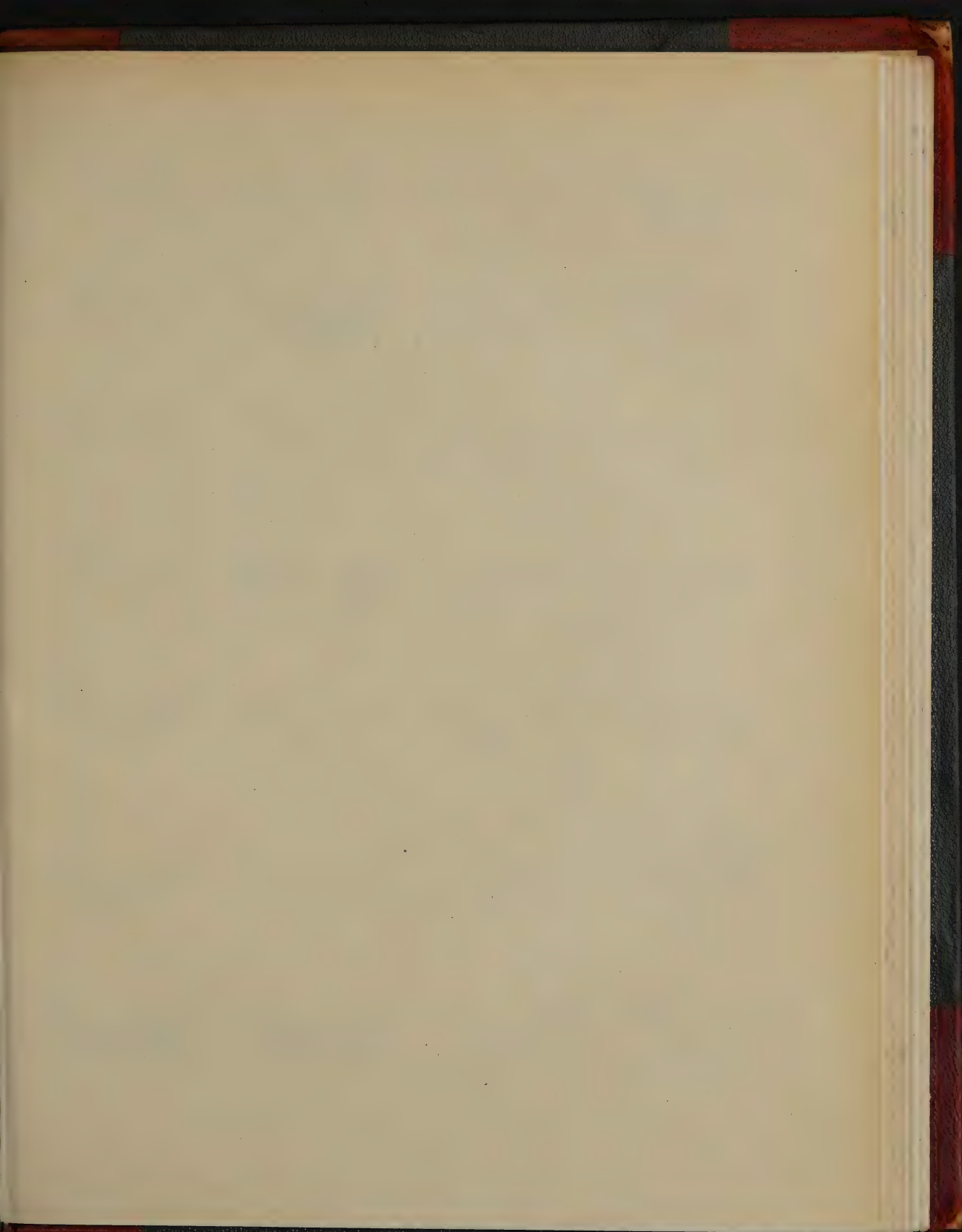


PLATE XXXII.

TINEIDAE.

FIG.		PAGE
1.	<i>Cryptolechia compsotypa</i> ♀	294
2.	<i>Izatha apodoxa</i> ♀	279
3.	„ <i>balanophora</i> ♂	279
4.	„ <i>prasophyta</i> ♀	281
5.	<i>Lathicrossa leucocentra</i> ♀	293
6.	<i>Izatha austera</i> ♀ (Plate III., fig. 31, larva.)	282
7.	„ <i>amorbas</i> ♀	282
8.	<i>Eutorna symmorpha</i> ♂	295
9.	„ <i>caryochroa</i> ♂	295
10.	<i>Barea dinocosma</i> ♀	289
11.	„ <i>confusella</i> ♀	289
12.	<i>Symmoca quadripuncta</i> ♂	295
13.	<i>Calicotis crueifera</i> ♀	297
14.	<i>Oxytheeta austrina</i> ♂	291
15.	<i>Scieropepla typhicola</i> ♀	295
16.	<i>Stathmopoda skelloni</i> ♂	299
17.	„ <i>phlegyra</i> ♂	299
18.	„ <i>caminora</i> ♂	298
19.	„ <i>distincta</i> ♀	298
20.	„ <i>holochra</i> ♀	299
21.	„ <i>plumbiflua</i> ♂	300
22.	<i>Cryptolechia semnodes</i>	294
23-25.	<i>Proteodes carnifex</i> varieties	292
26.	<i>Trachypepla vinaria</i> ♀	285
27.	<i>Eulechria zophoessa</i> ♀ (Plate III., fig. 14, larva.)	290
28.	<i>Vanicela disjunctella</i> ♂	298

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





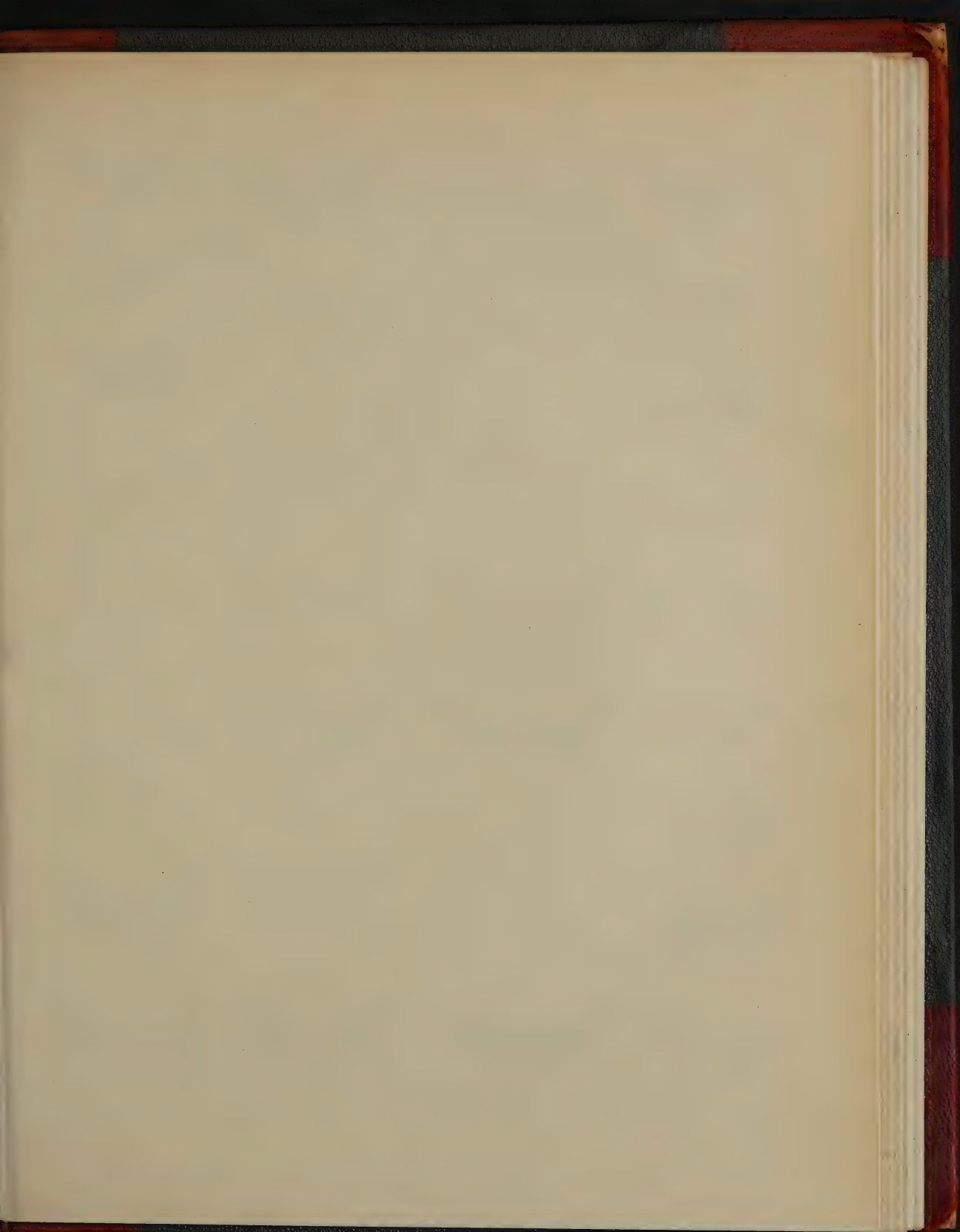


PLATE XXXIII.

TINEIDAE.

FIG.										PAGE
1.	<i>Simacthis iochondra</i>	♂	.....	.....	.....	.....	.....	.....	.....	308
2.	"	♀	.....	.....	.....	.....	.....	.....	.....	308
3.	<i>Hierodoris iophanes</i>	♂	.....	.....	.....	.....	.....	.....	.....	305
4.	<i>Thylacosceles acridomima</i>	♂	.....	.....	.....	.....	.....	.....	.....	309
5.	"	♀	.....	.....	.....	.....	.....	.....	.....	309
6.	<i>Trochilium tipuliforme</i>	♂	.....	.....	.....	.....	.....	.....	.....	250
7.	<i>Coridomorpha stella</i>	♂	.....	.....	.....	.....	.....	.....	.....	305
8.	"	♀	.....	.....	.....	.....	.....	.....	.....	305
9.	<i>Glyphipteryx bactrias</i>	♂	.....	.....	.....	.....	.....	.....	.....	312
10.	"	<i>cionophora</i>	♂	.....	.....	.....	.....	.....	.....	311
11.	"	<i>achlyoessa</i>	♀	.....	.....	.....	.....	.....	.....	312
12.	"	♂	.....	.....	.....	.....	.....	.....	.....	312
13.	"	<i>rugata</i>	♀	.....	.....	.....	.....	.....	.....	312
14.	<i>Pantosperma holochalca</i>	♀	.....	.....	.....	.....	.....	.....	.....	311
15.	<i>Glyphipteryx metasticta</i>	♂	.....	.....	.....	.....	.....	.....	.....	312
16.	"	<i>aulogramma</i>	♂	.....	.....	.....	.....	.....	.....	312
17.	"	♀	.....	.....	.....	.....	.....	.....	.....	312
18, 19.	"	<i>oxymachaera</i>	♀ varieties	.....	.....	.....	.....	.....	.....	313
20.	"	<i>transversella</i>	♀	.....	.....	.....	.....	.....	.....	313
21.	<i>Erechthias terminella</i>	♂	.....	.....	.....	.....	.....	.....	.....	325
22.	<i>Glyphipteryx aerifera</i>	♂	.....	.....	.....	.....	.....	.....	.....	313
23.	<i>Heliothibis atychioides</i>	♀	(Plate III., fig. 13, larva.)	.....	.....	.....	.....	.....	.....	306
24.	"	<i>callispora</i>	♀	.....	.....	.....	.....	.....	.....	306
25.	"	<i>illita</i>	♀	.....	.....	.....	.....	.....	.....	307
26.	"	<i>electrica</i>	♀	.....	.....	.....	.....	.....	.....	306
27.	<i>Choreutis bjerkanarella</i>	♀	.....	.....	.....	.....	.....	.....	.....	310
28.	<i>Simacthis antigrapha</i>	♂	.....	.....	.....	.....	.....	.....	.....	309
29.	"	<i>combinatana</i>	♀ (Plate III., fig. 32, larva.)	.....	.....	.....	.....	.....	.....	307
30.	"	<i>ministra</i>	♀	.....	.....	.....	.....	.....	.....	308
31.	"	<i>exocha</i>	♀	.....	.....	.....	.....	.....	.....	307

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



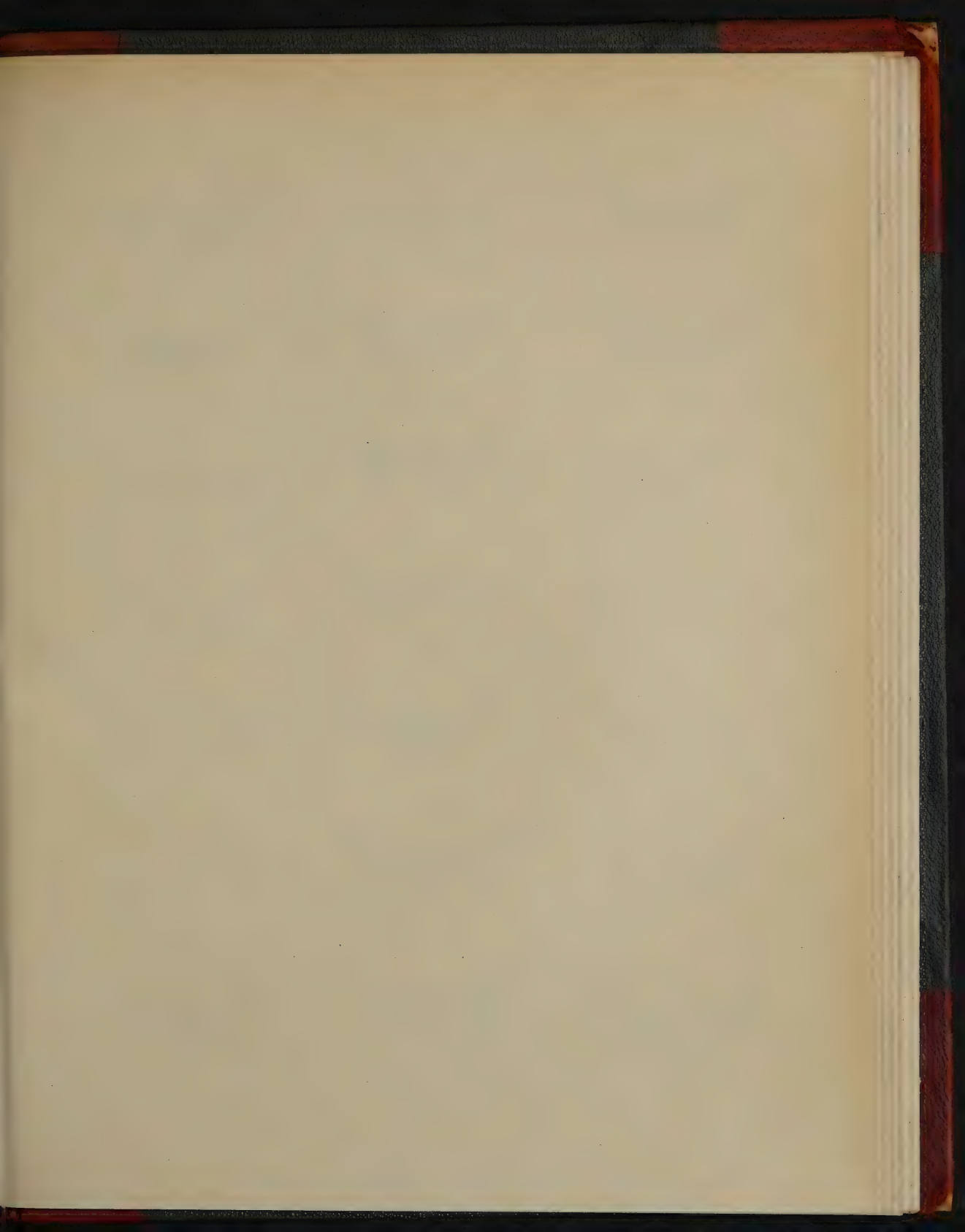
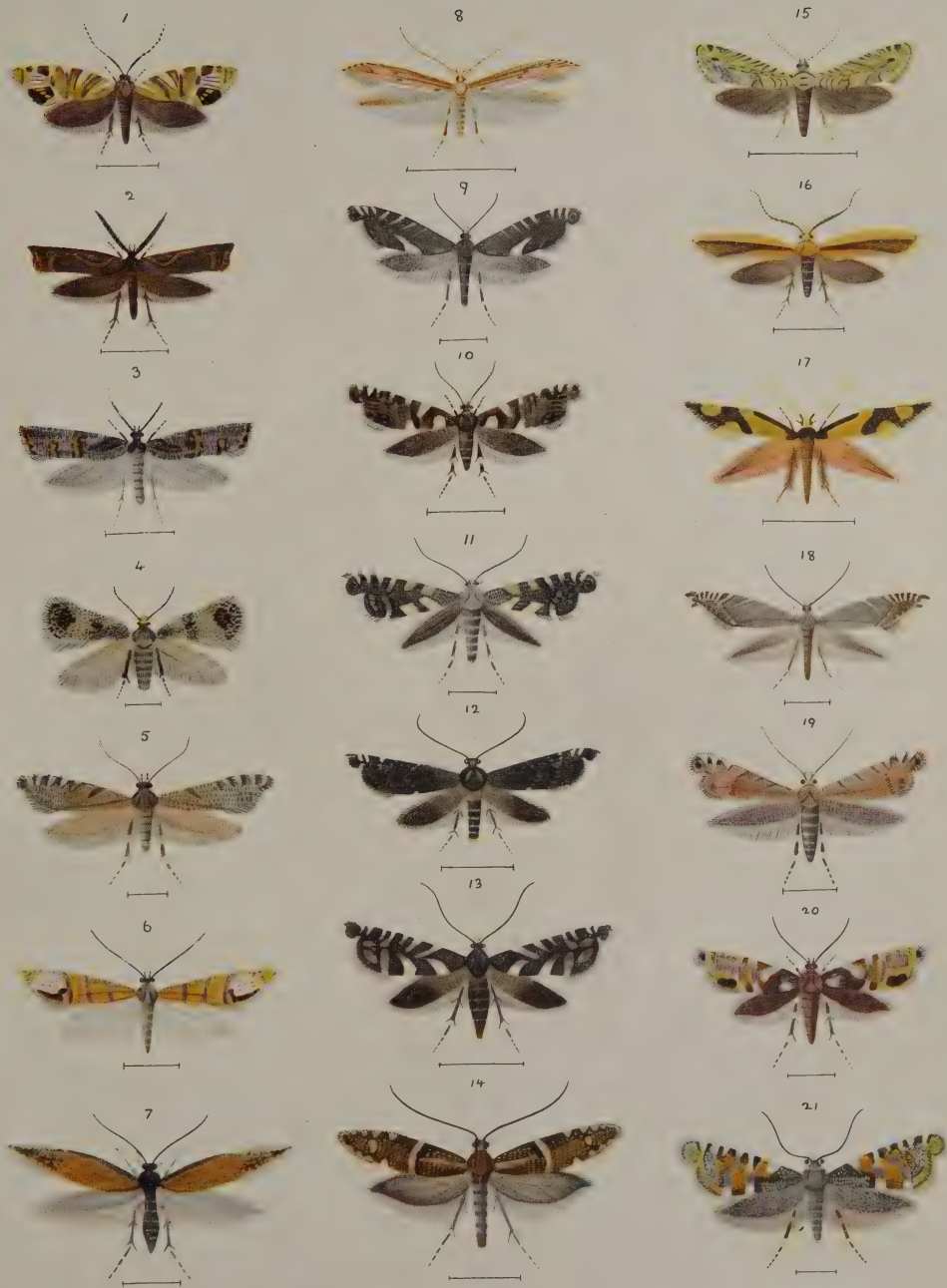


PLATE XXXIV.

TINEIDAE.

FIG.		PAGE
1.	<i>Protosynaema eratopis</i> ♂	327
2.	" <i>steropucha</i> ♂ (Plate III., figs. 19-20, larvae; fig. 21, pupa.)	326
3.	" <i>quaestuosa</i> ♂ variety	326
4.	<i>Nepticula cypraema</i> ♂	355
5.	<i>Glyphipteryx aérotheeta</i> ♀	316
6.	" <i>trisclena</i> ♀	317
7.	" <i>aenea</i> ♀	311
8.	<i>Batrachedra eucola</i>	304
9.	<i>Glyphipteryx leptosema</i> ♂	314
10.	" <i>zelota</i>	316
11.	" <i>asteronota</i> ♂	315
12.	" <i>calliaetis</i> ♂ (Plate III., fig. 35, larva.)	314
13.	" " ♀	
14.	<i>Astrogenes chrysograpta</i> ♂	348
15.	<i>Doxophytis hydrocosma</i> ♀	325
16.	<i>Phylacodes cauta</i>	327
17.	<i>Opogona comptella</i> ♀	333
18.	<i>Glyphipteryx iocheaera</i> ♀ (Plate III., fig. 22, larva; fig. 23, pupa.)	314
19.	" <i>nephoptera</i> ♀	316
20.	" <i>erastis</i> ♀	317
21.	" <i>euastera</i> ♂	315

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





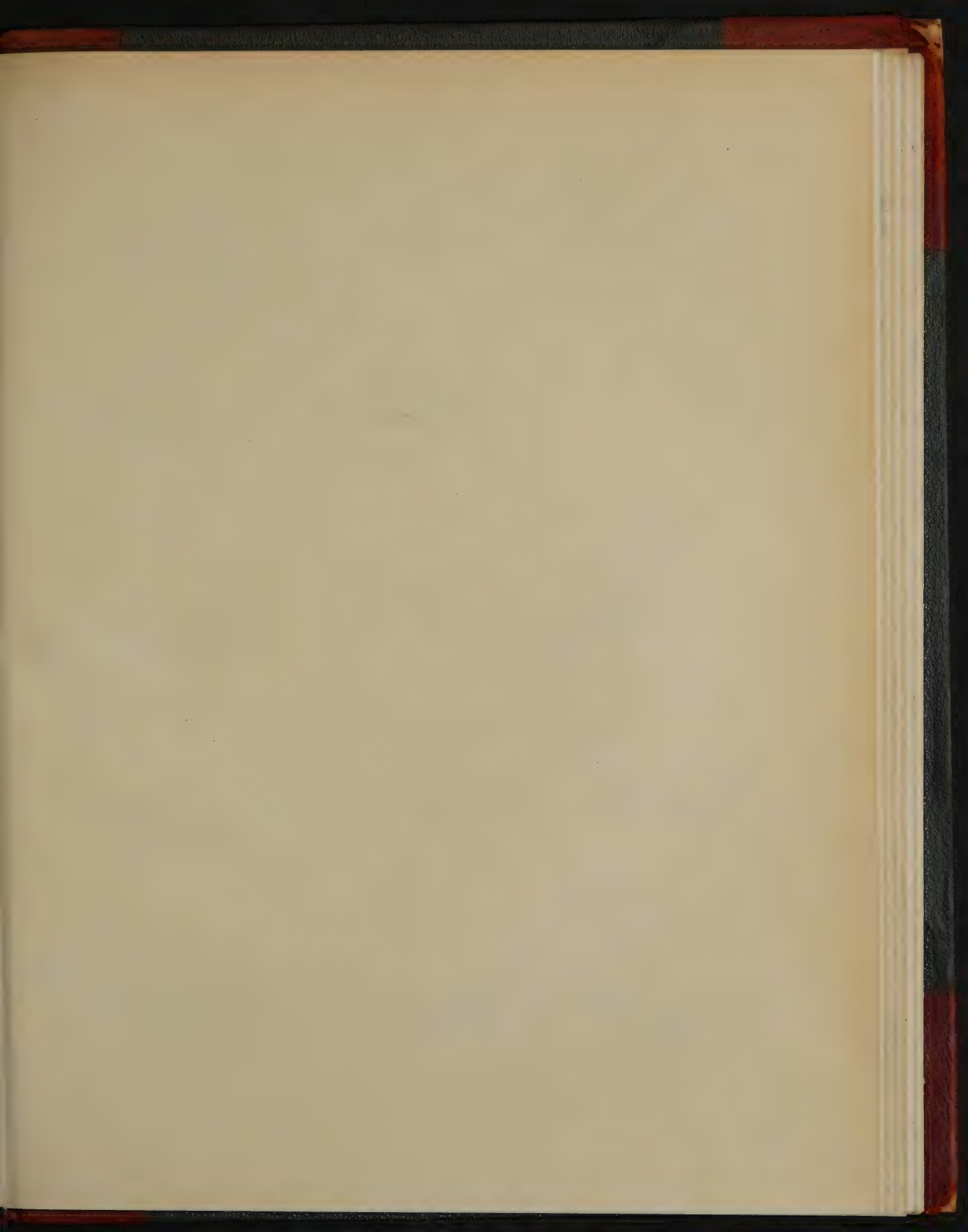
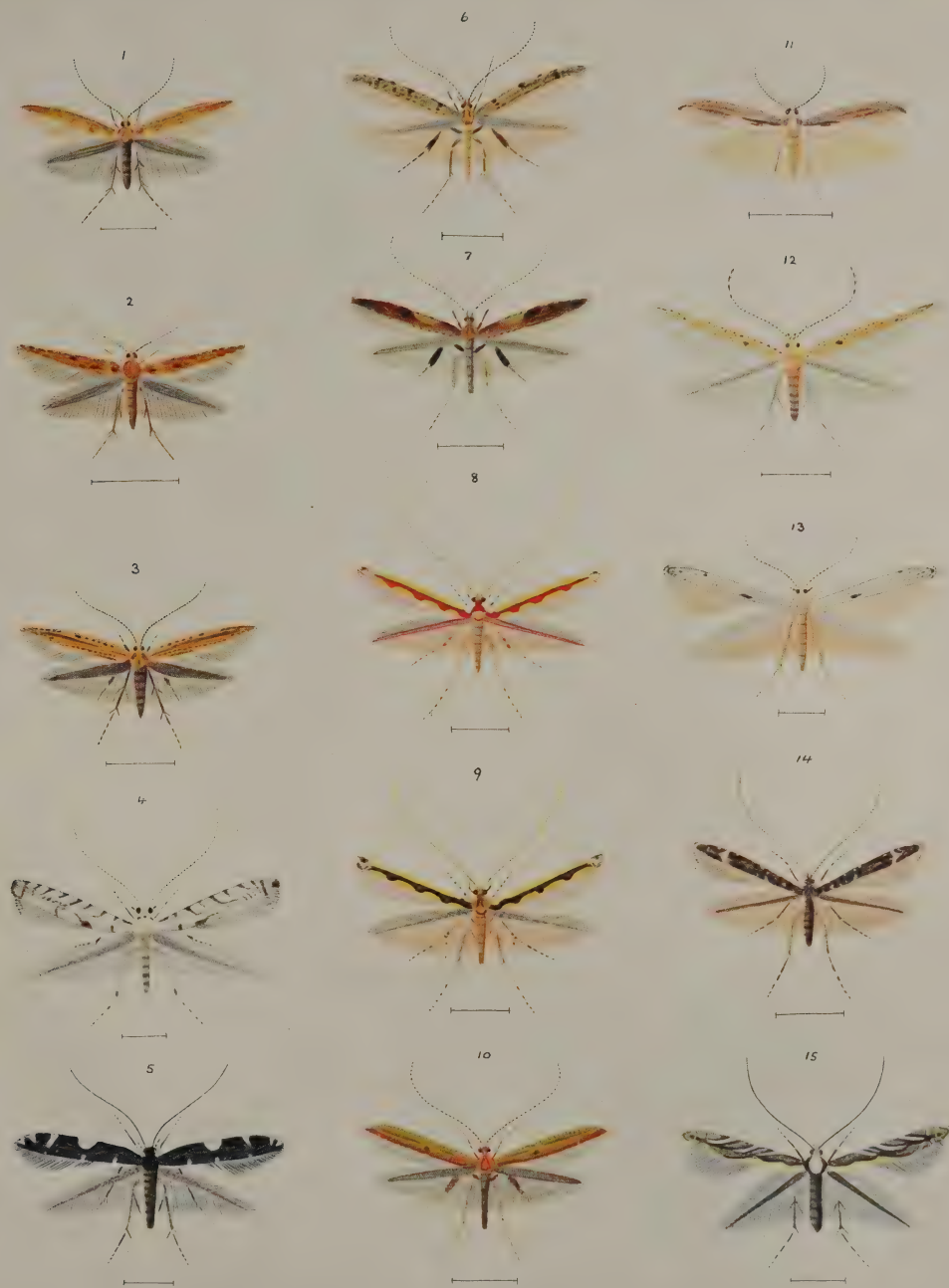


PLATE XXXV.

TINEIDAE.

FIG.									PAGE
1.	<i>Gracilaria selenitis</i> ♀	.....	.....	.....	.....	.....	.....	.....	324
2.	<i>Batrachedra agaura</i> ♀	.....	.....	.....	.....	.....	.....	.....	304
3.	<i>Gracilaria elaeas</i> ♀	.....	.....	.....	.....	.....	.....	.....	323
4.	<i>Parectopa aellomacha</i> ♀	.....	.....	.....	.....	.....	.....	.....	322
5.	<i>Aerocercops zorionella</i> ♂	.....	.....	.....	.....	.....	.....	.....	321
6.	<i>Gracilaria linearis</i> ♂	.....	.....	.....	.....	.....	.....	.....	323
7.	„ <i>chalcodelta</i> ♂	.....	.....	.....	.....	.....	.....	.....	324
8.	<i>Parectopa miniella</i> type	.....	.....	.....	.....	.....	.....	.....	323
9.	„ „ variety	.....	.....	.....	.....	.....	.....	.....
10.	<i>Gracilaria chrysitis</i> ♂	.....	.....	.....	.....	.....	.....	.....	324
11.	<i>Zelleria copidota</i> ♀	.....	.....	.....	.....	.....	.....	.....	320
12.	<i>Batrachedra arenosella</i>	.....	.....	.....	.....	.....	.....	.....	304
13.	„ <i>psathyra</i> ♂ (Plate XLIV., fig. 8 ♀.)	.....	.....	.....	.....	.....	.....	.....	303
14.	<i>Aerocercops cyanospila</i> ♀	.....	.....	.....	.....	.....	.....	.....	321
15.	<i>Parectopa citharoda</i> ♀	.....	.....	.....	.....	.....	.....	.....	322

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



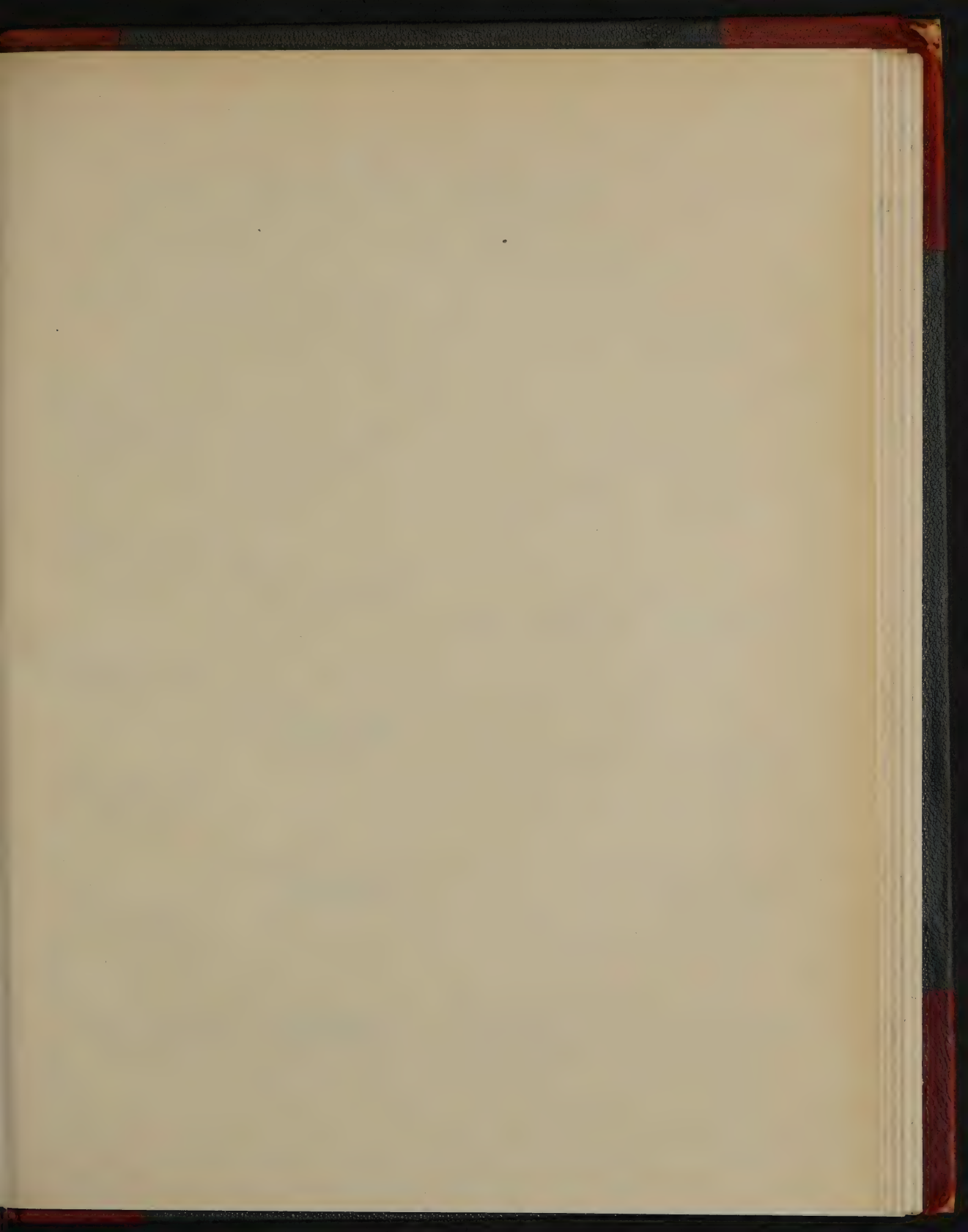


PLATE XXXVI.

TINEIDAE.

FIG.		PAGE
1.	<i>Plutella megalynta</i> (natural size.)	330
2.	<i>Dolichernis chloroleuca</i> ♂	325
3.	<i>Orthenchus saleuta</i> ♀	328
4.	" <i>drosochalea</i> ♀	328
5.	" <i>prasimodes</i> ♀	329
6, 29.	" <i>porphyritis</i> varieties. (Plate XLVII., fig. 17.)	328
7.	<i>Plutella maeulipemis</i> ♀	331
8.	" " ♂	
9.	" <i>sera</i> ♂	330
10.	" <i>psammochroa</i> ♂	331
11.	<i>Opogona omosopa</i> ♂	332
12.	" " ♀	
13.	<i>Erechthias externella</i> ♀	334
14.	" " ♂	
15.	<i>Eugennaea laquearia</i> ♀	333
16.	<i>Erechthias charadrota</i> ♂	335
17.	<i>Hectacma chasmatias</i> ♂	336
18.	" <i>stilbella</i> ♀	336
19.	<i>Erechthias aerodina</i> ♀	334
20.	" <i>fulguritella</i> ♀	336
21.	" <i>hemielistra</i> ♀ (Plate III., fig. 36, larva; 37, pupa.)	335
22.	" <i>exospila</i> ♀	335
23.	<i>Endophthora omogramma</i>	339
24.	<i>Amphixystis hapsimacha</i> ♂	333
25.	" " ♀	
26.	<i>Dryadula castanea</i> ♂	338
27.	<i>Tephrosara cimberia</i> ♂	337
28.	<i>Hectacma chionodira</i> ♀	336

Except figure 1 all the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



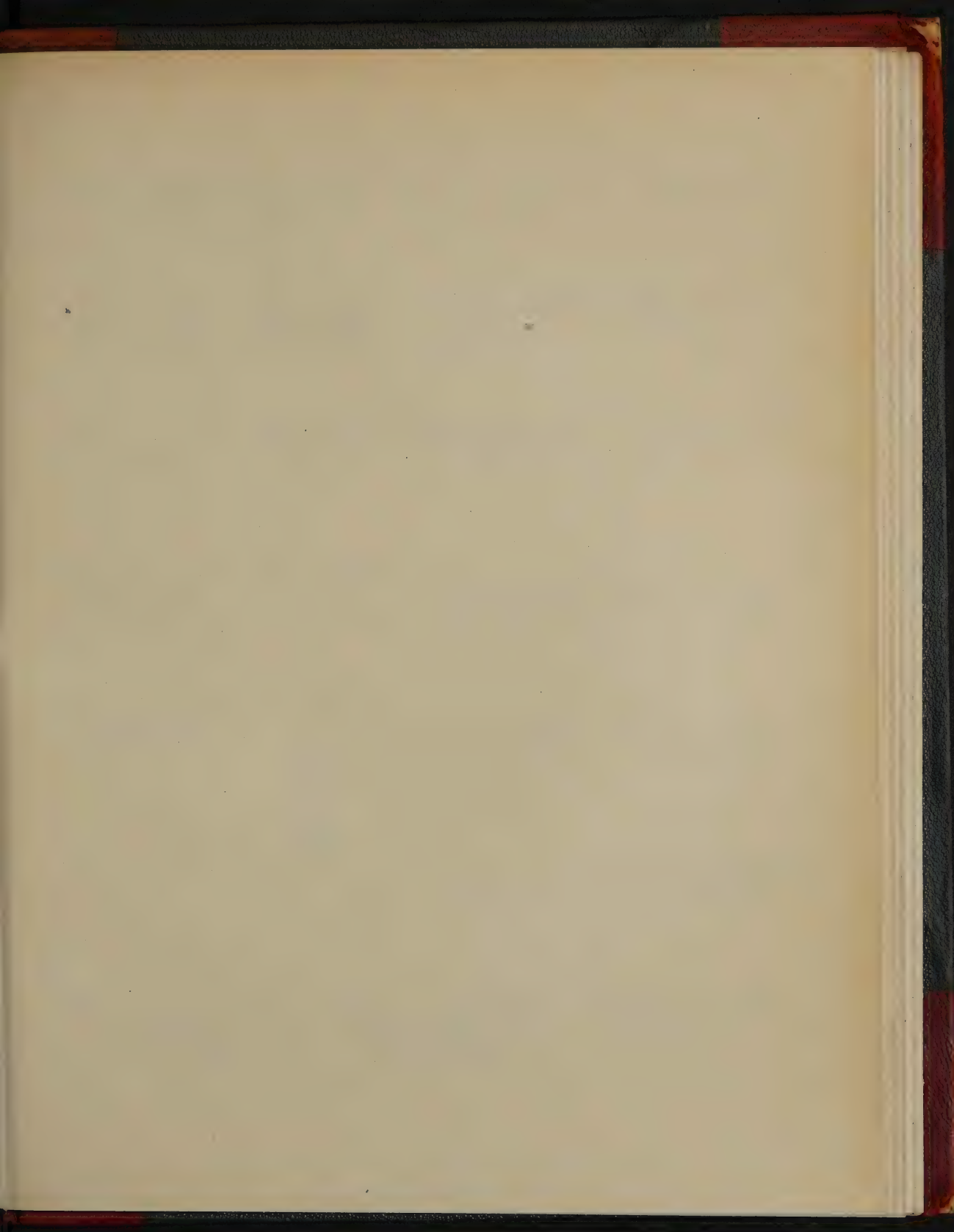


PLATE XXXVII.

TINEIDAE.

FIG.		PAGE
1.	<i>Eschatotypa derogatella</i> ♂	338
2.	„ <i>melichrysa</i> ♀	338
3.	<i>Archyala paraglypta</i> ♂	342
4.	„ <i>pentazyga</i> ♂	342
5.	„ <i>terraea</i> ♀	342
6.	<i>Crypsitricha mesotypa</i> ♂	340
7.	„ <i>stereota</i> ♀	339
8.	<i>Tinea dicharaeta</i> ♀	347
9.	„ <i>argodelta</i>	347
10.	<i>Taleporia microphanes</i> ♂ (Plate III., fig. 12, larva in case.)	352
11.	<i>Scoriodyta conisalia</i> ♂ (Plate III., fig. 33, larva in case; 34, ditto withdrawn from case)	354
12.	„ „ ♀ standing on larval case	
13.	<i>Tinea astraea</i> ♂	346
14.	<i>Sagephora felix</i> ♀	343
15.	„ <i>steropastis</i>	343
16.	<i>Charixena iridoxa</i> ♂	317
17.	<i>Proterodesma byrsopola</i> ♂	349
18.	„ „ ♀	
19.	<i>Dryadula myrrhina</i> ♀	337
20, 21.	<i>Sagephora phortegella</i> varieties	343
22.	<i>Crypsitricha roseata</i> ♂	340
23.	<i>Basantis sirenica</i> ♂	342
24.	<i>Tinea sphenocosma</i> ♀	346
25.	<i>Monopis ornithias</i> ♀	344
26.	<i>Tinea margaritis</i> ♀	345

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





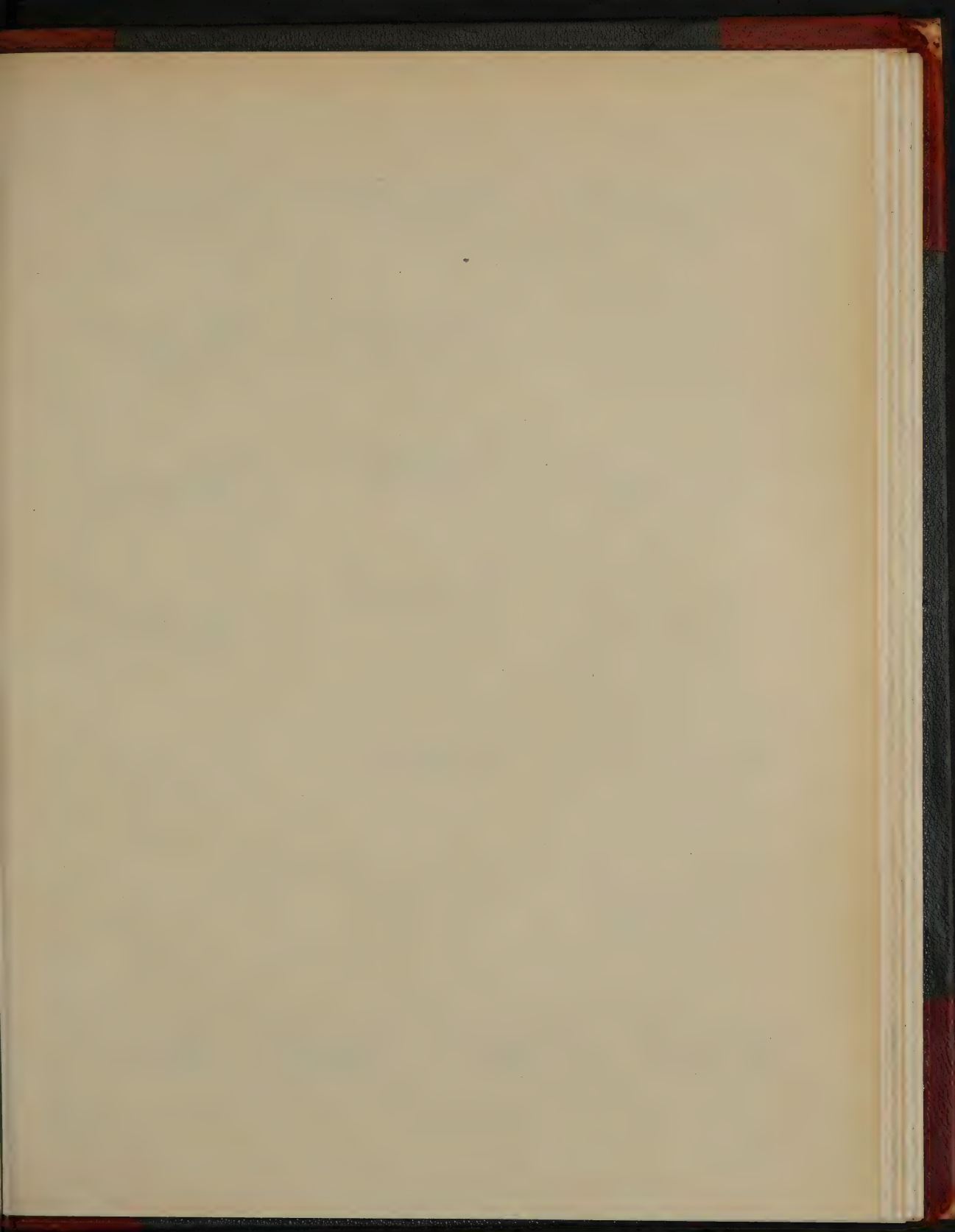


PLATE XXXVIII.

TINEIDAE.

FIG.		PAGE
1.	Anisoplaea ptyoptera ♂	259
2.	Epithectis zophochalea ♂	253
3.	Apatetris melanombra ♂	252
4.	Elachista ombrodoea ♂	319
5.	Stathmopoda mysteriastis	300
6.	„ aposema ♀	300
7.	Borkhausenia epichalea ♂	267
8.	„ honorata ♀	261
9.	„ phegophylla ♀	265
10.	„ monodonta ♂	267
11.	„ thalerodes ♂	268
12.	Glyphipteryx brachydelta ♂	315
13.	„ barbata ♂	317
14.	Zelleria rorida ♂	320
15.	Borkhausenia eriphaca ♀	264
16.	Thylacosecles radians ♂	301
17.	„ „ ♀	
18.	Trachypepla semilauta ♀	283
19.	Ortheneches chlorocoma	329
20.	„ vinitineta ♂	329
21.	Hierodoris stellata ♂	305
22.	Borkhausenia aphrontis ♂	267

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.





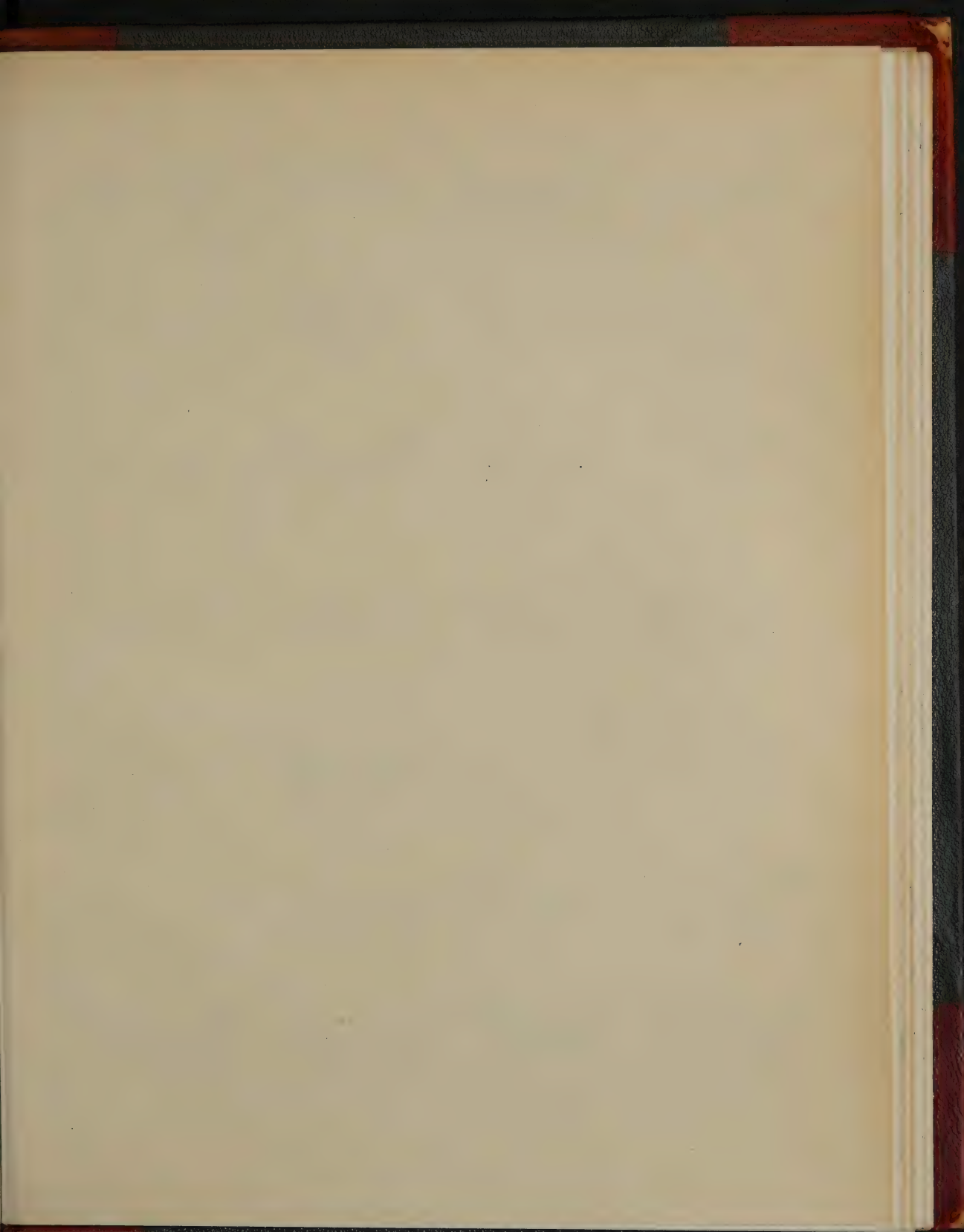


PLATE XXXIX.

		TINEIDAE.	PAGE
FIG.			
1.	Monopis ethelella ♀	.....	344
2.	Trichophaga tapetiella ♀	.....	344
3.	Thallostoma eurygrapha ♀	.....	343
4.	Prothinodes lutata ♂	.....	348
5.	„ grammocosma ♂	.....	348
6.	Mallobathra arancosa	.....	352
7.	Taleporia aphrosticha ♂	.....	351
8.	Lysiphragma howesii ♂	.....	350
9.	„ mixochlora ♂	.....	349
10.	„ epixyla ♀ (Plate III., fig. 30, larva.)	.....	350
11.	Mallobathra globulosa ♂	.....	353
12.	„ homalopa ♂	.....	353
13.	Tinea conferta ♂	.....	347
14.	„ mochlota ♂	.....	347
15.	Mallobathra lapidosa ♂ (Plate III., fig. 10, larva withdrawn from case; fig. 11, ditto in case.)	.....	353
16.	„ „ ♀	.....
22.	Monopis crociapitella ♂	.....	344
		MICROPTERYGIDAE.	
17.	Sabatinea chrysargyra ♂	.....	369
18.	„ caustica ♀	.....	369
19.	„ incongruella ♂	.....	370
20.	„ rosicoma ♀	.....	368
21.	„ zonodoxa ♀	.....	368
23.	Mnesarchaea loxoseia ♂	.....	367
24.	„ hamadelpha ♂	.....	367
25.	Sabatinea quadrijuga ♀	.....	369
26.	Mnesarchaea paracosma ♀	.....	366
27.	Micropardalis dorozena ♀	.....	367
28.	Sabatinea calliarcha ♂	.....	371

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



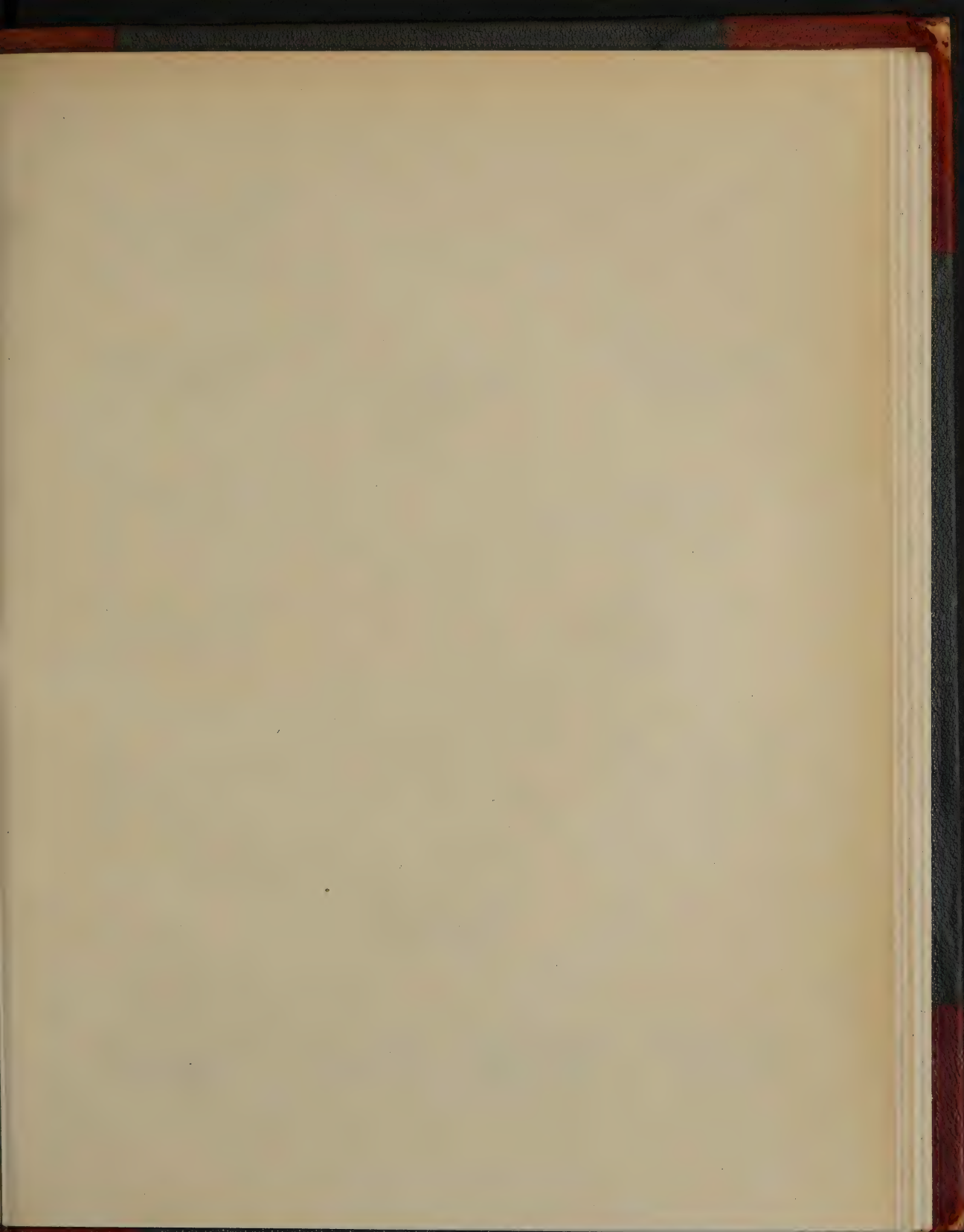


PLATE XL.

TINEIDAE.

FIG.									PAGE
1.	Endopthora pallacopis	♂	.....	.....	.....	.....	.....	.....	339
2.	Mallobathra crataea	♂	.....	.....	.....	.....	.....	.....	353
3.	Orthenchus semifasciata	♀	.....	.....	.....	.....	.....	.....	329
4.	Tinea fuscipunctella	♂	.....	.....	.....	.....	.....	.....	347
5.	Dolichernis jubata	♂	.....	.....	.....	.....	.....	.....	325
6.	Nepticula oriastra	♂	.....	.....	.....	.....	.....	.....	356
20.	" "	♀	.....	.....	.....	.....	.....	.....
7.	Simaethis microlitha	♂	.....	.....	.....	.....	.....	.....	309
8.	Erechthias lychnopa	♂	.....	.....	.....	.....	.....	.....	334
9.	Elachista ochroleuca	♂	.....	.....	.....	.....	.....	.....	320
10.	Sitotroga cerealella	♀	.....	.....	.....	.....	.....	.....	259
11.	Batrachedra filicicola	♂	.....	.....	.....	.....	.....	.....	304
12.	" "	♀	.....	.....	.....	.....	.....	.....
13.	Simaethis barbiger	♂	.....	.....	.....	.....	.....	.....	310
14.	" colpota	♀	.....	.....	.....	.....	.....	.....	308
15.	Crypsitricha pharotoma	♀	.....	.....	.....	.....	.....	.....	339
16.	Rhathamietis perspersa	♂	.....	.....	.....	.....	.....	.....	345
17.	Proterodesma mysticopa	♀	.....	.....	.....	.....	.....	.....	349
18.	Sagephora exsangui	♂	.....	.....	.....	.....	.....	.....	343
19.	Habrophila compsecta	♂	.....	.....	.....	.....	.....	.....	340
21.	Simaethis symbolaea	♂	.....	.....	.....	.....	.....	.....	308

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



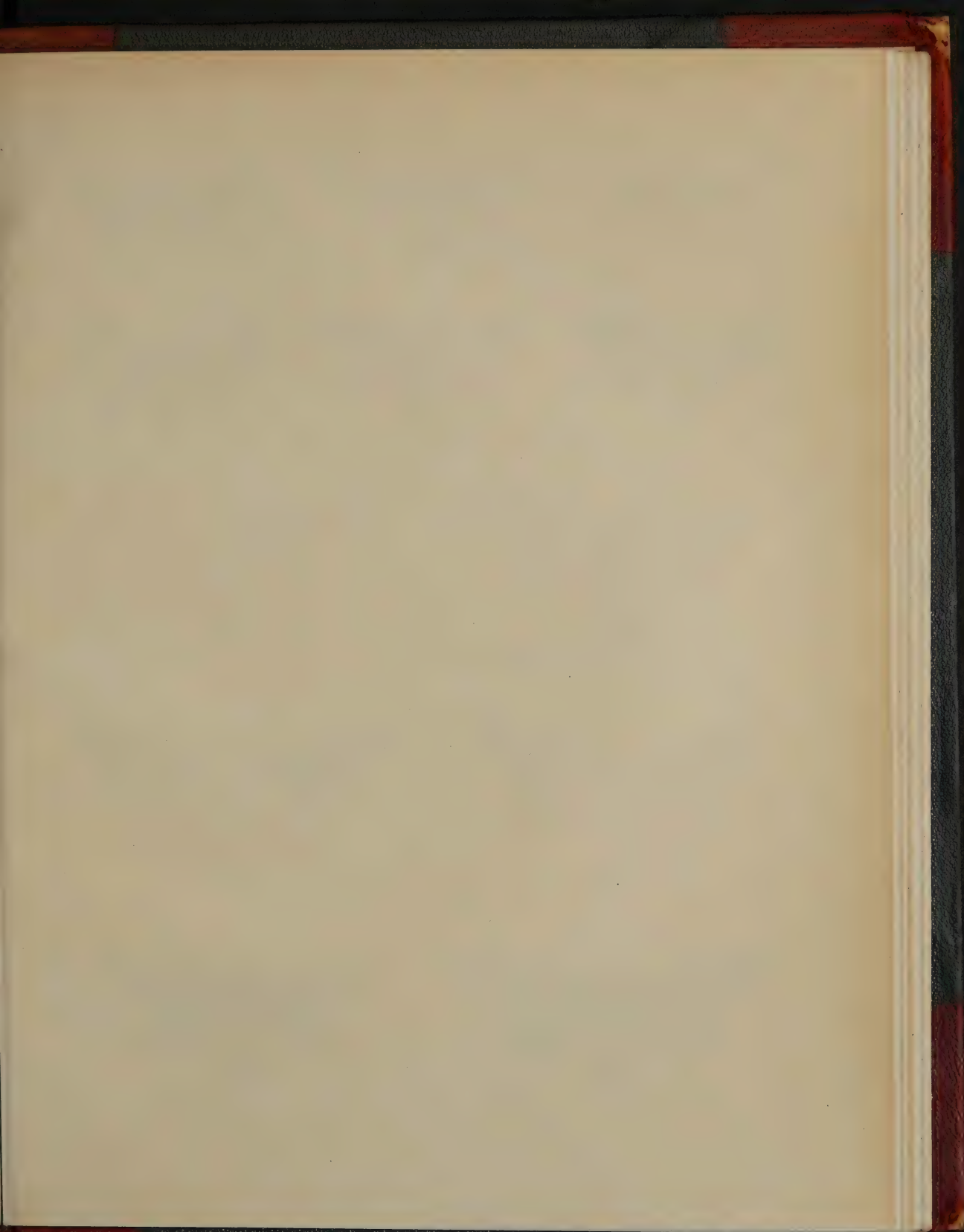
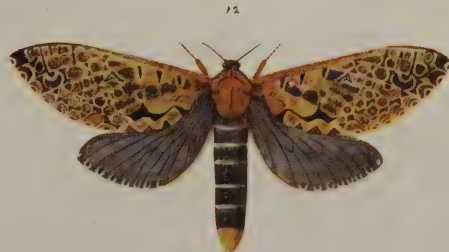
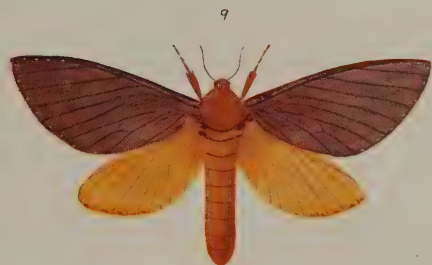


PLATE XLI.

HEPIALIDAE.

FIG.		PAGE
1, 3.	<i>Porina umbræculata</i> ♂ varieties. (Plate III., fig. 26, larva.)	363
2.	" " ♀	
4-6.	" <i>enysii</i> ♂ varieties. (Plate III., fig. 27, larva.)	361
7-10.	" " ♀ "	
11.	" <i>characterifera</i> ♂	362
12.	" " ♀	

All the figures are slightly less than the natural size.



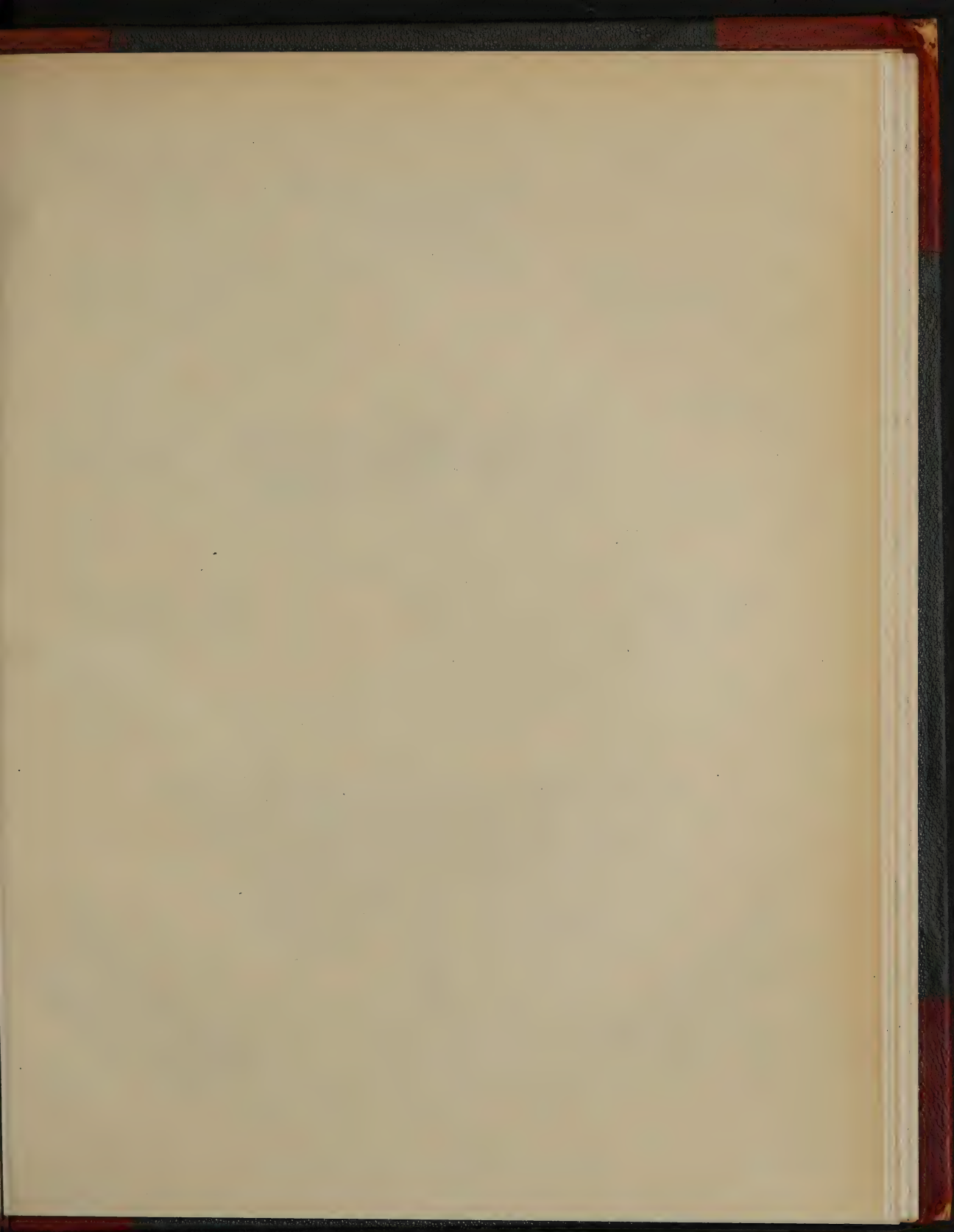


PLATE XLII.

HEPIALIDAE.

FIG.		PAGE
1.	<i>Porina jocosus</i> ♂	363
2.	" " ♀	
3.	" <i>minos</i> ♂ alpine variety	365
4.	" " ♀. (See Pl. XLIII., fig. 12.)	
5.	" " ♂	
6.	" <i>dinodes</i> ♂ (Plate III., fig. 24, larva.)	360
7.	" " ♀	
8.	" <i>copularis</i> ♂	363
9.	" " ♀	
10.	" <i>fusca</i> ♂ variety	364
11.	" " ♂	364
12.	" <i>aurimaculata</i> ♂	360
13.	<i>Hepialus virescens</i> ♂	357
14.	" " ♀	

All the figures are slightly less than the natural size.



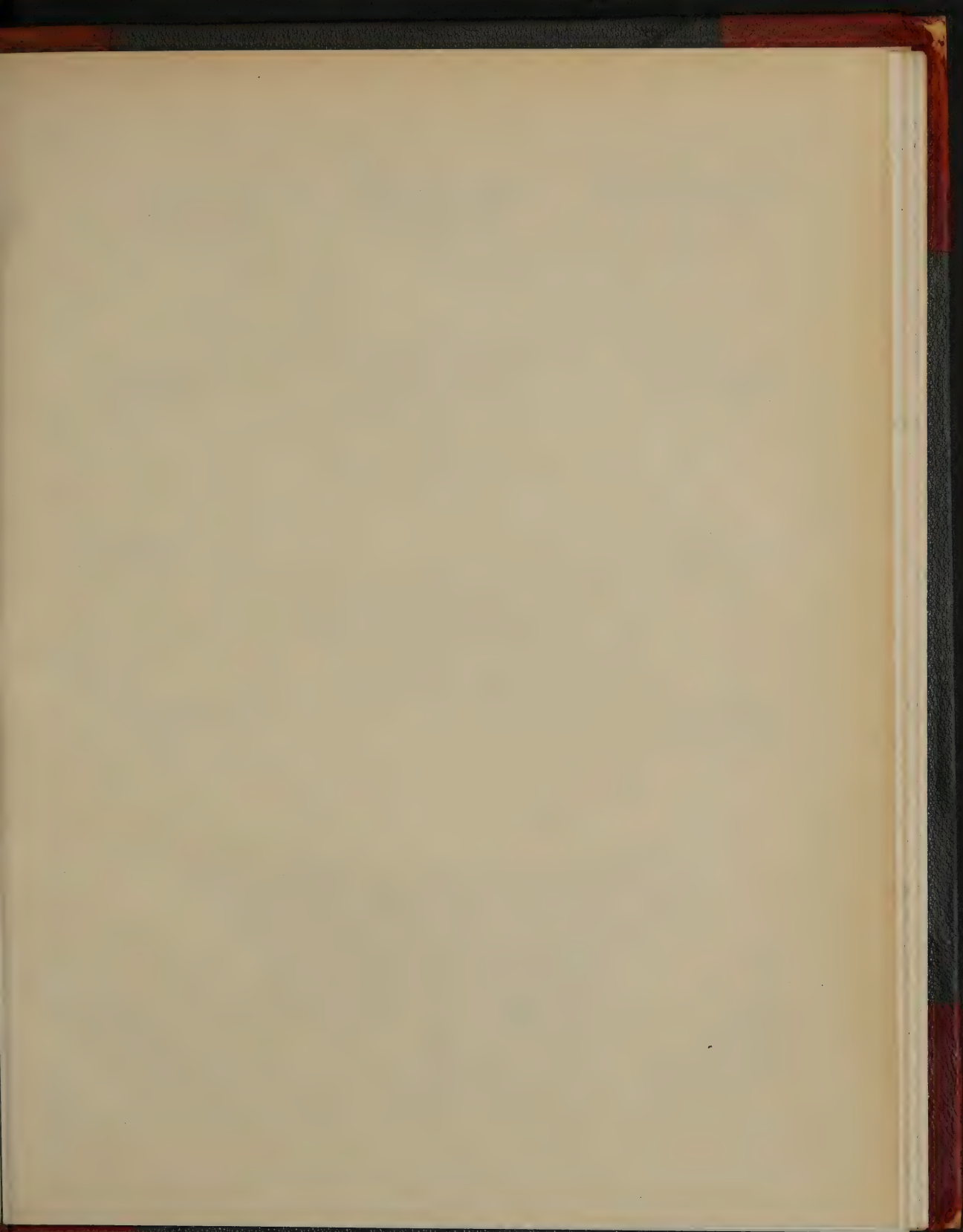


PLATE XLIII.

HEPIALIDAE.

FIG.		PAGE
1.	<i>Porina senex</i> ♂ (Plate XLIX., fig. 20 ♀)	360
2, 3.	" <i>signata</i> ♂ varieties. (Plate III., fig. 28, larva.)	363
4.	" " ♀	
5, 6.	" <i>cervinata</i> ♂ varieties	362
7.	" " ♀ (Frontispiece, fig. 26, egg.)	
8.	" <i>despecta</i> ♂	362
9-11.	" " ♀ varieties	
12.	" <i>minos</i> ♂ North Island form. (See Plate XLII., figs. 3, 4, and 5.)	365
13.	<i>Hepialus virescens</i> ♂ variety	357
14.	" " ♀ "	

All the figures are slightly less than the natural size.



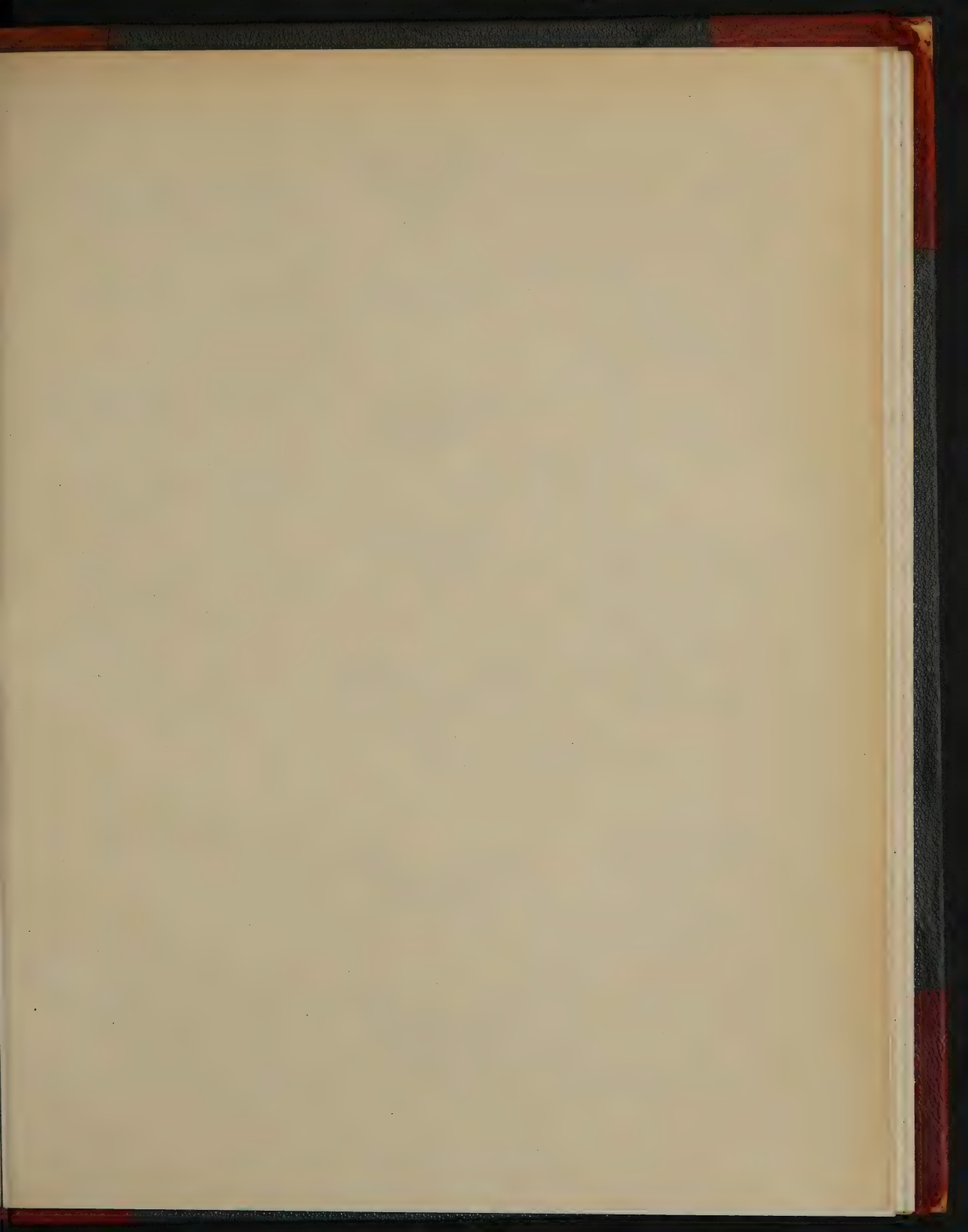


PLATE XLIV.

FIG.	ARCTIADAE.	PAGE
7.	<i>Celama parvitis</i> ♀	44
	NOCTUIDAE.	
16.	<i>Aletia accurata</i> ♂	57
17.	„ <i>munda</i> ♀	57
30.	<i>Ophiura pulcherrima</i> ♀	79
32.	<i>Melanchra olivea</i> variety ♀ (Plate IX., figs. 30, 31.)	67
	GEOMETRIDAE.	
4.	<i>Chloroclystis bilineolata</i> variety. (Plate XI., fig. 8.)	93
5.	<i>Xanthorhoe bryopsis</i> ♂	115
6.	<i>Selidosema ombrodes</i> ♂	144
28.	<i>Tatosoma apicipallida</i> ♂	86
29.	„ „ ♀	
31.	„ <i>fasciata</i> ♂ (Plate XII., fig. 1, ♀.)	86
	PYRALIDAE.	
1.	<i>Crambus oppositus</i> ♂	164
2.	„ „ ♀	
3.	„ <i>scutatus</i> ♂	164
10.	<i>Orocerambus cultus</i> ♀	160
11.	<i>Scoparia fumata</i> ♂	204
12.	<i>Delogenes limodoxa</i> ♂	157
13.	<i>Ephestia kuehniella</i> ♀	156
21.	<i>Meecyna notata</i> ♂	181
22.	<i>Scoparia axena</i> ♂	196
23.	„ <i>declivis</i> ♀	200
24.	„ <i>scripta</i> ♂	200
	PSYCHIDAE.	
9.	<i>Orophora unicolor</i> ♂ (Plate III., fig. 18, case.)	214
14.	<i>Oeceticus omnivorus</i> ♂ (Plate III., fig. 25, larva.)	212
	TORTRICIDAE.	
25.	<i>Gelophaula palliata</i> ♀ (Plate XXV., fig. 35 ♂.)	235
26.	<i>Tortrix fastigata</i> ♂	231
27.	„ „ ♀	
	TINEIDAE.	
8.	<i>Batrachedra psathyra</i> ♀ (Plate XXXV., fig. 13 ♂.)	303
18.	<i>Titanomis tetragona</i> ♂	351
33.	<i>Erechthias indicans</i> ♀	335
	HEPIALIDAE.	
15.	<i>Porina mimica</i> ♂	362
19.	„ <i>oreas</i> ♂	364
20.	„ „ ♀	

Three of the figures are magnified and in these the approximate expanse of the wings is shown by a line beneath each figure.



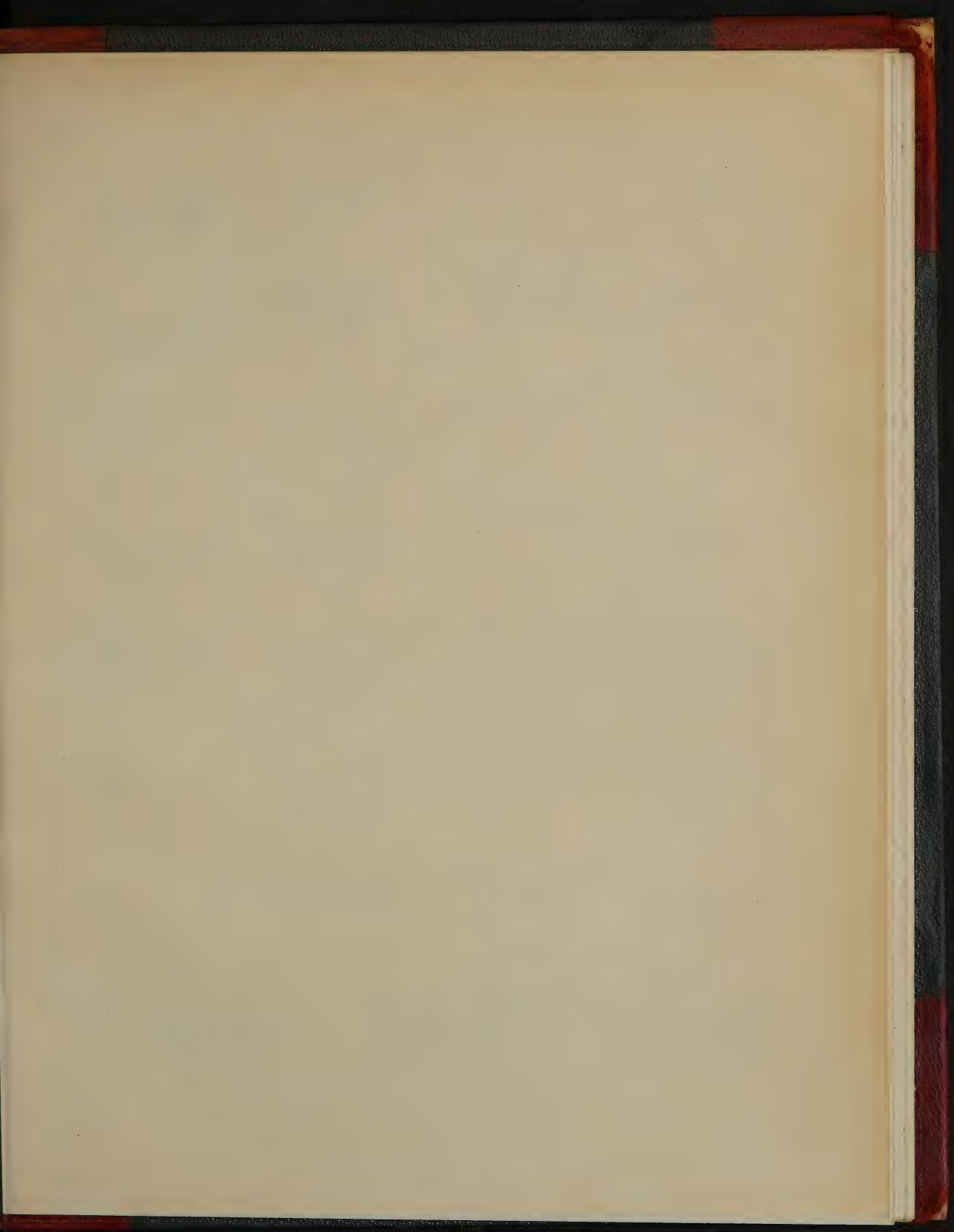


PLATE XLV.

PYRALIDAE.

FIG.		PAGE
1.	<i>Orocrambus scoparioides</i> ♀	160
2.	<i>Scoparia caliginosa</i> ♀	202
3.	" <i>fimbriata</i> ♂	194
4.	" <i>epicremna</i> ♀	203
5.	" <i>animosa</i> ♂	186
6.	" <i>acompa</i> ♂	195
7.	<i>Plodia interpunctella</i> ♀	156
18.	<i>Crambus saristes</i> ♀	162
25.	<i>Scoparia atmogramma</i> ♂	197

TORTRICIDAE.

8.	<i>Eurythecta varia</i> ♀	224
9.	<i>Ochetarcha miraculosa</i> ♂; (Natural size. Plate XXV., fig. 33, var.)	244
10.	<i>Pyrgotis consentiens</i> ♂	219
11.	<i>Tortrix alopecana</i> ♀	230
12.	<i>Epichorista emphanes</i> ♀ variety. (Plate XXVI., figs. 30, 31.)	238
13.	" <i>eribola</i> ♂	238
14.	<i>Eurythecta curva</i> ♂	225
15.	<i>Tortrix lotinana</i> ♂	220
16.	<i>Epichorista zatrophana</i> ♂	238
17.	<i>Tortrix aerodana</i> ♂	227
19.	" <i>tigris</i> ♀	229
20, 21.	<i>Epichorista persecta</i> ♂ varieties. (Plate XXVI., fig. 19.)	237
26.	<i>Tortrix philopoana</i> ♀	226
27.	<i>Capua arcuata</i> ♀	223
28.	<i>Tortrix sphenias</i> ♂	231
29.	<i>Proselena antiquana</i> ♂	219
30.	<i>Bactra optanias</i> ♀	248
31.	<i>Hendeasticha aethaliana</i> ♂	245

TINEIDAE.

22.	<i>Isonomentis amauropa</i> ♂ (Plate III., fig. 8, larva.)	297
23.	" " " ♀	
24.	<i>Gelechia aerobatis</i>	257

Except No. 9, all the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



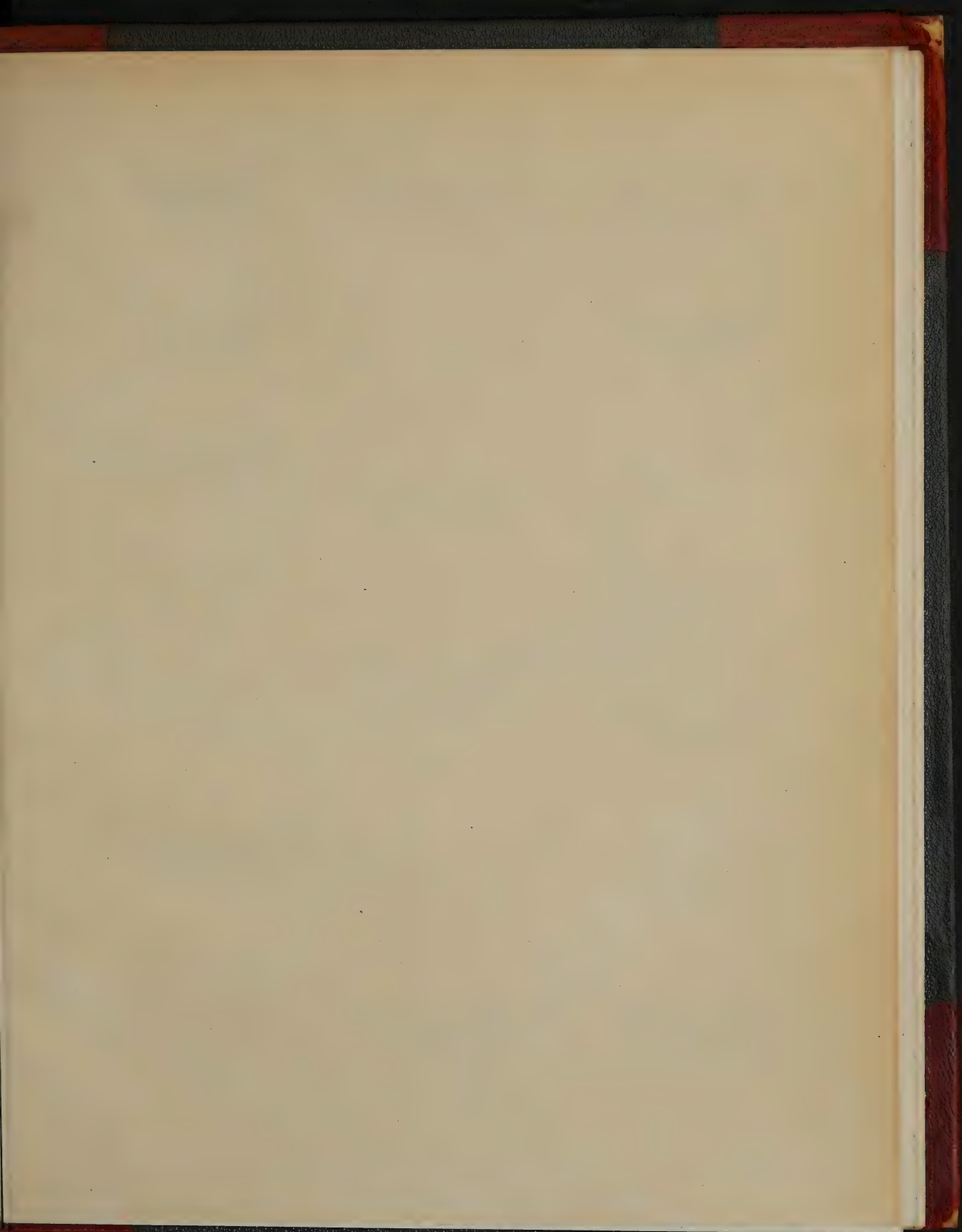


PLATE XLVI.

FIG.	TINEIDAE.	PAGE
1.	<i>Simaethis analoga</i> ♀	309
2.	<i>Borkhausenia freta</i> ♂	264
3.	<i>Euthictis chloratna</i> ♀	291
4.	<i>Orthenchus polita</i> ♀	329
5.	<i>Mallobathra metrosema</i> ♂	353
6.	<i>Borkhausenia oxyina</i> ♀	267
7.	<i>Glyphipteryx ataraeta</i> ♂	312
8.	<i>Trachypepla photinella</i> ♂	286
9.	<i>Tineola biselliella</i> ♂	345
10.	<i>Irenicodes eurychora</i> ♂	259
11.	<i>Parectopa aethalota</i> ♀	322
12.	<i>Elachista thallophora</i> ♂	319
13.	<i>Erechthias macrozyga</i> ♀	336
14.	<i>Glyphipteryx acronoma</i> ♀	316
15.	<i>Trithamnora certella</i> ♂	349
16.	" " ♀	
17.	<i>Mallobathra illustris</i>	353
MICROPTERYGIDAE.		
18.	<i>Sabatinea codora</i> ♀	370
19.	" <i>barbarica</i> ♀	370
20.	<i>Micropardalis aurella</i> ♀	367

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



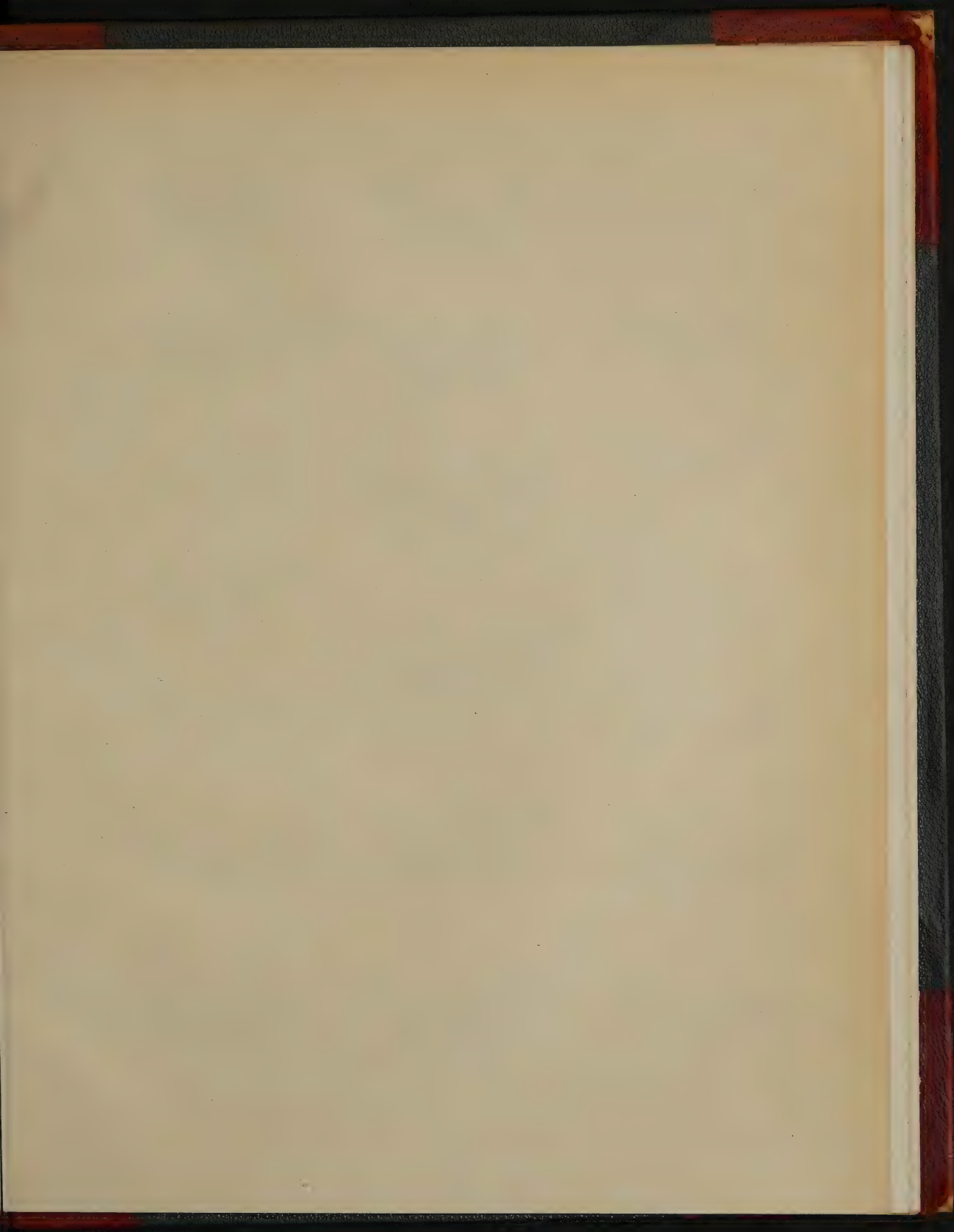


PLATE XLVII.

FIG.	TORTRICIDAE.	PAGE
1.	<i>Tortrix antichroa</i> ♂	232
4.	„ <i>melanosperma</i> ♂	227
5.	<i>Spilonota dolopaea</i> ♀ (Plate XXVII., fig. 25 ♂.)	245
TINEIDAE.		
2.	<i>Tinea accusatrix</i> ♂	346
3.	<i>Elachista exaula</i> ♂ (Plate XXVIII., fig. 15, variety.)	319
6.	<i>Borkhausenia ancogramma</i> ♀	268
7.	<i>Thiotricha olcariæ</i> ♂ (Plate II., fig. 30, larva.)	254
8.	<i>Parectopa panacivagans</i> ♂	322
9.	<i>Archyala halosparta</i> ♂	342
10.	<i>Nepticula progonopis</i> ♂	356
11.	<i>Hectacma crypsinima</i> ♂	336
13.	<i>Tinea cymodoce</i> ♂	346
14.	<i>Borkhausenia homodoxa</i> ♂	268
15.	<i>Tinea fagicola</i> ♂	346
16.	<i>Mallobathra perisscuta</i> ♀	353
17.	<i>Orthenches porphyritis</i> , var. ♀ (Plate XXXVI., figs. 6, 29.)	329
18.	„ <i>virgata</i> ♀	330
19.	„ <i>glypharcha</i> ♀	330
20.	<i>Nepticula lucida</i> ♀	355
MICROPTERYGIDAE.		
12.	<i>Sabatinea aenea</i> ♂	370

All the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



PLATE XLVIII.

		NOCTUIDAE.	PAGE
FIG.			
6.	<i>Melanchra praesignis</i> ♀ var. (Plate IX., figs. 12, 29.)	.....	66
18.	" <i>levis</i> ♂ var. (Plate VIII., fig. 28.)	.....	74
31.	" <i>inchoata</i> ♂	.....	69
32.	" " ♀	.....
35.	<i>Agrotis spina</i> ♂	.....	48
		GEOMETRIDAE.	
1.	<i>Asthena schistaria</i> ♂	.....	104
2.	" " ♀	.....
3.	<i>Chloroclystis semiochlora</i> ♂	.....	92
4.	" " ♀	.....
12.	" <i>punicea</i> ♀	.....	91
19.	<i>Hydriomena callichlora</i> ♂ var. (Plate XII., figs. 47, 48.)	.....	100
20.	" <i>haemophaca</i> ♂	.....	101
23.	<i>Selidosema prototoxa</i> ♂	.....	142
24.	" " ♀	.....
25.	<i>Samana falcata</i> ♂	.....	133
26.	<i>Selidosema productata</i> var. <i>flumea</i> ♂	.....	139
27.	" <i>ochrea</i> ♂	.....	142
29.	<i>Hydriomena prionota</i> ♂	.....	102
30.	" " ♀	.....
33.	<i>Epirrhanthis aleatoria</i> ♀ var. (Plate XVI., figs. 5-8.)	.....	136
34.	<i>Selidosema campbelli</i>	.....	138
		PYRALIDAE.	
5.	<i>Tauroscopa glaucophanes</i> ♀ var. (Plate XX., figs. 45, 46.)	.....	171
7.	<i>Scoparia cinetacta</i> ♂	.....	188
8.	" <i>pascoella</i> ♀	.....	203
14.	<i>Endotricha pyrosalis</i> ♂	.....	205
15.	<i>Orocrambus ventosus</i> ♂	.....	159
16.	" " ♀	.....
17.	<i>Crambus ephorus</i> ♂	.....	163
		TORTRICIDAE.	
10.	<i>Epichorista tenebrosa</i> ♂	.....	237
11.	" " ♀	.....
13.	<i>Gelophaula lychnophanes</i> ♂	.....	236
28.	<i>Tortrix inusitata</i> ♀	.....	232
		TINEIDAE.	
9.	<i>Taleporia cawthronella</i> ♂	.....	352
21.	<i>Stathmopoda trimolybdias</i> ♀	.....	299
22.	<i>Glyphipteryx xestobela</i> ♂	.....	311
36.	<i>Gelechia dividua</i> ♂	.....	257
37.	<i>Glyphipteryx xestobela</i> ♀	.....	311

Seven of the figures are magnified, and in these the approximate expanse of the wings is shown by a line beneath each figure.



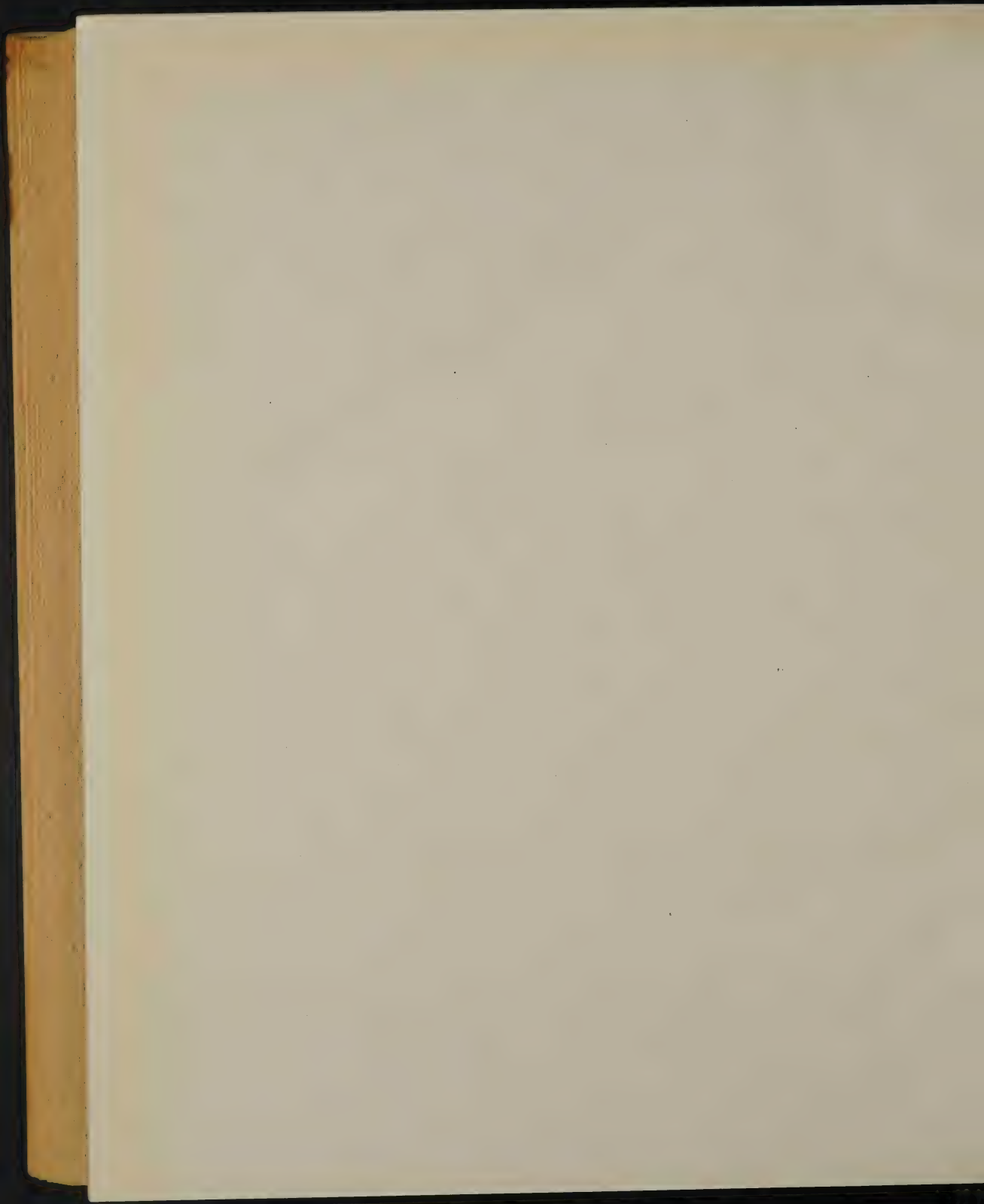


PLATE XLIX.

		NOCTUIDAE.						PAGE
FIG.								
17.	Melanchra fenwicki ♂	.....	.....	.....	.....	.....	.....	73
18.	" averilla ♀	.....	.....	.....	.....	.....	.....	68
31.	Aletia gourlayi ♂	.....	.....	.....	.....	.....	.....	57
GEOMETRIDAE.								
1.	Orthoclydon chlorias ♂ (Plate XIV., fig. 46.)	.....	.....	.....	.....	.....	.....	107
2.	" " ♀	.....	.....	.....	.....	.....	.....
6.	Tatosoma monoviridisata ♂	.....	.....	.....	.....	.....	.....	86
7.	" " ♀	.....	.....	.....	.....	.....	.....
PYRALIDAE.								
3.	Scoparia zophochlaena ♂	.....	.....	.....	.....	.....	.....	186
19.	Diptychophora planetopa ♂	.....	.....	.....	.....	.....	.....	174
TORTRICIDAE.								
5.	Tortrix spatiosa ♀	.....	.....	.....	.....	.....	.....	229
8.	Spilonota macropetana ♂	.....	.....	.....	.....	.....	.....	247
10.	Crocosema plebeiana ♂	.....	.....	.....	.....	.....	.....	248
29.	Gelophaula brevicula ♂	.....	.....	.....	.....	.....	.....	236
30.	" " ♀	.....	.....	.....	.....	.....	.....
32.	Ecelitica incendiaria ♀	.....	.....	.....	.....	.....	.....	242
33.	Philocryptica polypodii ♀	.....	.....	.....	.....	.....	.....	241
TINEIDAE.								
4.	Chersadaula ochrogastra ♀	.....	.....	.....	.....	.....	.....	272
12.	" " ♂	.....	.....	.....	.....	.....	.....
13.	Isonomeutis restincta ♀	.....	.....	.....	.....	.....	.....	297
16.	Hierodoris frigida ♂	.....	.....	.....	.....	.....	.....	305
22.	Trachypepla roseata ♀	.....	.....	.....	.....	.....	.....	285
23.	Stathmopoda coracodes ♂	.....	.....	.....	.....	.....	.....	299
25.	Cryptolechia rhodobapta ♂	.....	.....	.....	.....	.....	.....	294
26.	Narycia petrodoxa ♀	.....	.....	.....	.....	.....	.....	354
27.	Heliosibes chlorobela ♂	.....	.....	.....	.....	.....	.....	307
28.	" " ♀	.....	.....	.....	.....	.....	.....
11.	Cadmogenes literata ♂	.....	.....	.....	.....	.....	.....	327
HEPIALIDAE.								
20.	Porina senex ♀ (Plate XLIII., fig. 1 ♂.)	.....	.....	.....	.....	.....	.....	360
21.	" ascendens ♀	.....	.....	.....	.....	.....	.....	365
MICROPTERYGIDAE.								
9.	Sabatinea lucilia ♂	.....	.....	.....	.....	.....	.....	371
14.	" passalota ♀	.....	.....	.....	.....	.....	.....	369
15.	" demissa ♀	.....	.....	.....	.....	.....	.....	368
24.	" ianthina ♀	.....	.....	.....	.....	.....	.....	368

Most of the figures are magnified and in these the approximate expanse of the wings is shown by a line beneath each figure.





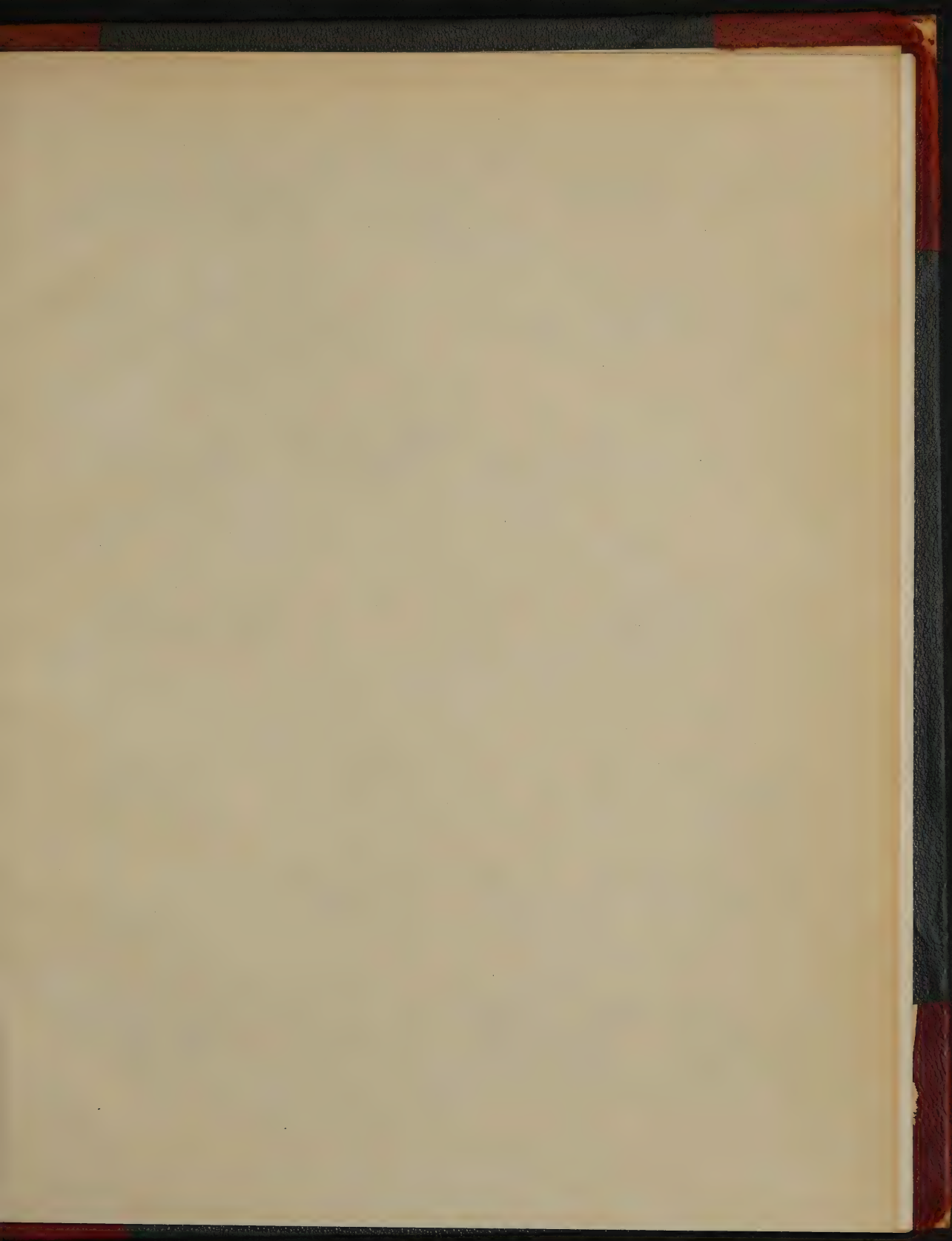


PLATE L.

FIG.		NOCTUIDAE.	PAGE
1.	<i>Ichneutica nervosa</i> ♂	.....	51
10.	„ <i>marmorata</i> ♂ (Plate LI., fig. 27.)	.....	51
17.	„ „ ♀	.....
		GEOMETRIDAE.	
22.	<i>Tatosoma nigra</i> ♀	.....	87
		PYRALIDAE.	
8.	<i>Scoparia microphthalma</i> ♂	.....	187
18.	<i>Crambus abditus</i> ♀	.....	167
19.	<i>Tauroscopa notabilis</i> ♂	.....	171
23.	<i>Scoparia falsa</i> ♂	.....	200
27.	„ <i>gracilis</i> ♂	.....	189
28.	„ <i>nomentis</i> ♂	.....	202
		TORTRICIDAE.	
4.	<i>Tortrix seruposa</i> ♂	.....	232
5.	<i>Catamaeta transfixa</i> ♂	.....	221
16.	<i>Epichorista clephantina</i> ♂	.....	237
20.	<i>Tortrix zestodes</i> ♀	.....	232
		TINEIDAE.	
3.	<i>Glyphipteryx octonaria</i> ♂	.....	313
6.	<i>Simaethis albifasciata</i> ♂	.....	309
7.	„ „ ♀	.....
9.	<i>Borkhausenia pallidula</i> ♂	.....	271
11.	<i>Thambotricha vates</i> ♂	.....	325
12.	<i>Phthorimaea heterospora</i> ♂	.....	256
13.	<i>Protosynaema quaestuosus</i> ♂	.....	326
14.	<i>Trachypepla indoleseens</i> ♂	.....	286
15.	<i>Endophtora tylogramma</i> ♂	.....	339
21.	<i>Heliothibis vibratrix</i> ♀	.....	307
24.	<i>Lindera tessellatella</i> ♂	.....	351
25.	<i>Orthenchus chartularia</i> ♂	.....	328
26.	<i>Borkhausenia pharmaetis</i> ♀	.....	264
		MICROPTERYGIDAE.	
2.	<i>Mnesarchaea fusca</i> ♂	.....	367

Most of the figures are magnified and in these the approximate expanse of the wings is shown by a line beneath each figure.





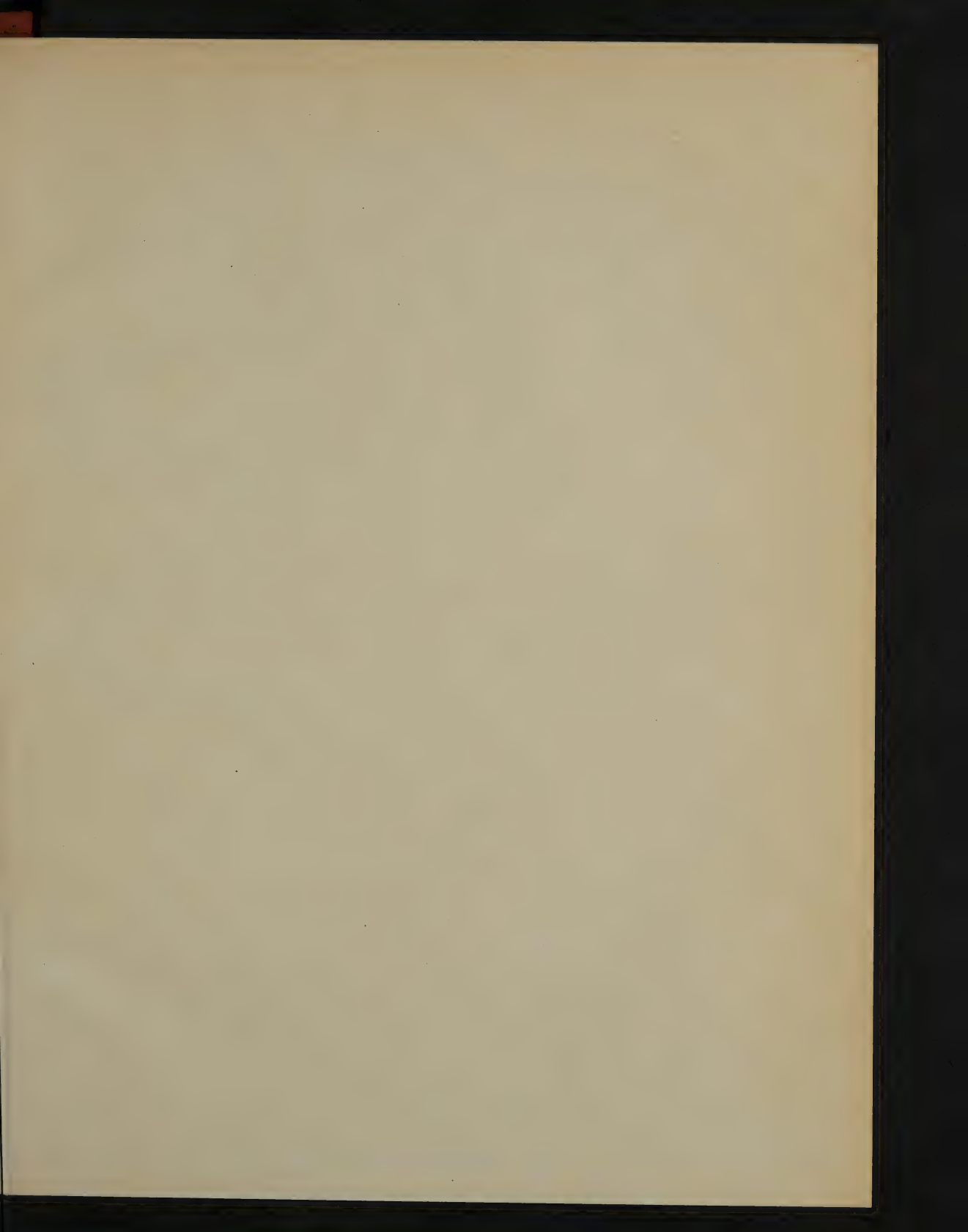


PLATE LI.

		NOCTUIDAE.	PAGE
FIG.			
27.	<i>Ichneutica marmorata</i> ♀ ; Arthur's Pass form. (Plate L., figs. 10, 17.)	.....	50
12.	<i>Sericea spectans</i> ♀	.....	81
		GEOMETRIDAE.	
8.	<i>Selidosema ampla</i> ♂	.....	143
15.	<i>Dasyuris octans</i> ♂	.....	128
17.	<i>Notoreas ortholeuca</i> ♂	.....	125
		PYRALIDAE.	
9.	<i>Galleria mellonella</i> ♀	.....	158
16.	<i>Orocerambus caesius</i> ♂	.....	159
18.	<i>Scoparia molifera</i> ♀	.....	187
23.	<i>Crambus scitulus</i> ♂	.....	165
		TORTRICIDAE.	
24.	<i>Capua intractana</i> ♀	.....	223
		TINEIDAE.	
1.	<i>Atomotricha prospiciens</i> ♂	.....	289
2.	" " ♀	.....
3.	<i>Borkhausenia affinis</i> ♂	.....	262
4.	" <i>vestita</i> ♂	.....	266
5.	" <i>plagiata</i> typical form ♂	.....	270
6.	" " pale var. ♂	.....
7.	" " dark var. ♀	.....
10.	" <i>serena</i> ♀	.....	269
11.	<i>Stathmopoda aristodoxa</i> ♂	.....	298
13.	<i>Dryadula pactolia</i> ♂	.....	338
14.	<i>Gelechia neglecta</i> ♂	.....	258
20.	<i>Barea exarcha</i> ♀	.....	289
*21.	<i>Stomopteryx simplicella</i> ♂	.....	253
22.	<i>Simaethis tillyardi</i> ♀	.....	310
28.	<i>Nepticula erichtitus</i> ♀	.....	356
29.	" <i>fulva</i> ♀	.....	356
30.	" <i>progama</i> ♂	.....	356
		HEPIALIDAE.	
19.	<i>Porina descendens</i> ♂	.....	364
		MICROPTERYGIDAE.	
25.	<i>Sabatinea aurantiaca</i> ♀	.....	369
26.	" <i>aemula</i> ♂	.....	369

Most of the figures are magnified and in these the approximate expanse of the wings is shown by a line beneath each figure.

*Now identified by Mr. Meyrick as *Stomopteryx subscivella*, Zell. (December, 1927).



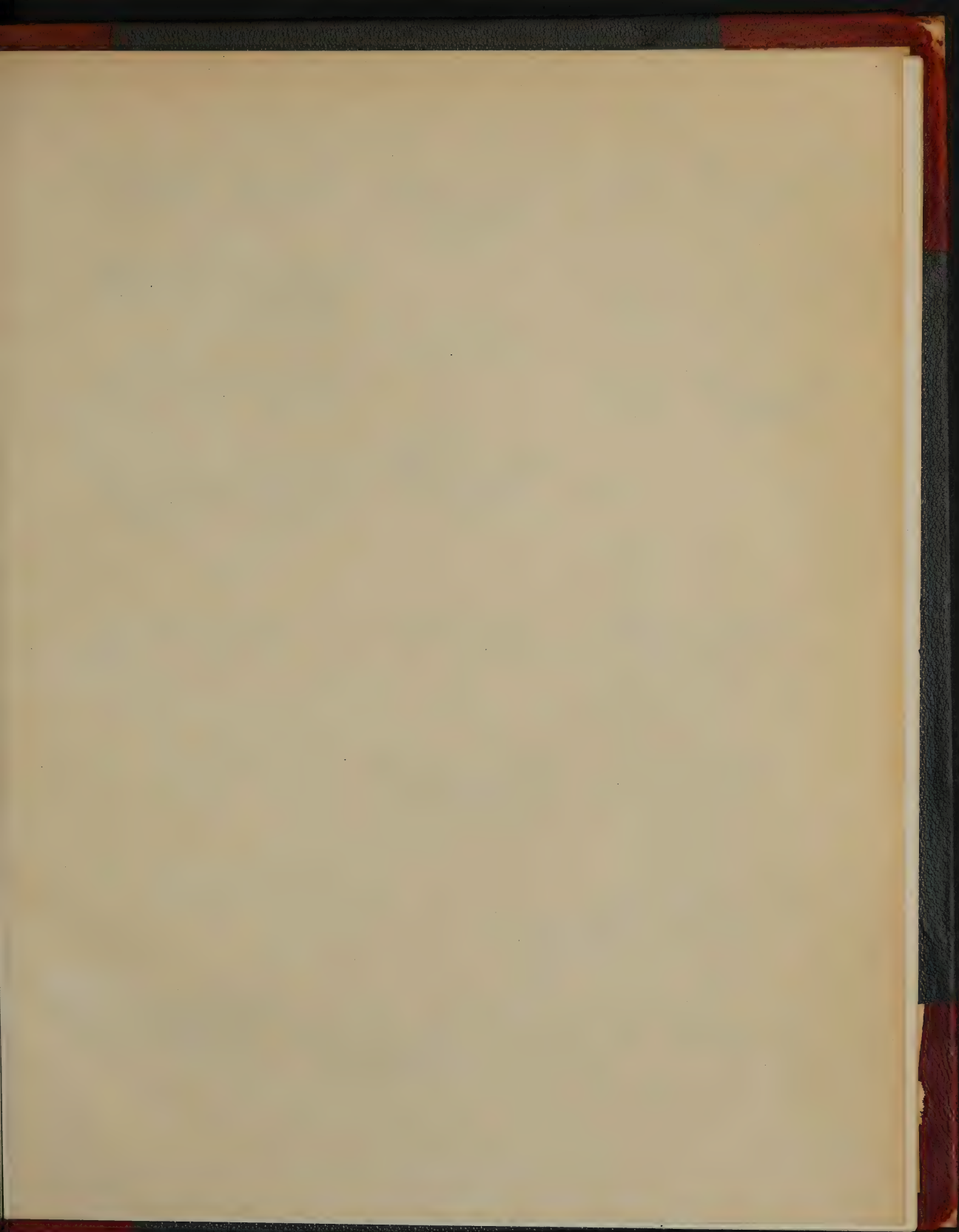








PLATE LII.

FIG.	GEOMETRIDAE.	PAGE
11.	<i>Xanthorhoe glaciata</i> ♂ 	118
	PYRALIDAE.	
9.	<i>Scoparia pachyerga</i> ♂	196
10.	„ <i>lychnophanes</i> ♀	188
30.	<i>Diptychophora bipunctella</i> ♀ 	175
	TORTRICIDAE.	
1.	<i>Cnephasia melanophaea</i> ♂	243
2.	„ „ ♀	
4.	<i>Harmologa columella</i> ♂ 	241
23.	„ <i>torotermia</i> ♂	241
25.	<i>Catamaeta calligypsa</i> ♀	221
26.	<i>Cnephasia paterna</i> ♂	244
28.	<i>Epichorista triorthota</i> ♂	239
29.	<i>Carpocosa sanctimonea</i> ♀ 	218
	TINEIDAE.	
3.	<i>Borkhausenia letharga</i> ♂ 	271
5.	<i>Gelechia caerulea</i> ♂	258
6.	<i>Mallobathra fragilis</i> ♂	353
7.	<i>Phthorimaea quieta</i> ♀	255
8.	<i>Lathierossa prophetica</i> ♂	293
12.	<i>Corocosma memorabilis</i> ♀ 	287
13.	<i>Tinea aetherea</i> ♂	347
14.	<i>Hectama decoranda</i> ♀	337
15.	<i>Barea ambigua</i> ♂	289
16.	<i>Crypsitricha generosa</i> ♂	340
17.	<i>Glyphipteryx scintilla</i> ♂	315
18.	<i>Thectophila aemotypa</i> ♀	302
19.	<i>Simaethis urbana</i> ♂	309
20.	<i>Proteodes melographa</i> ♂	292
21.	<i>Philobota amenena</i> ♀	291
22.	<i>Borkhausenia paula</i> ♀	263
24.	<i>Simaethis nivescens</i> ♀	310
27.	<i>Proteodes clarkei</i> ♀	293
31.	<i>Hierodoris insignis</i> ♀	306
32.	<i>Tinea lindsayi</i> ♂	348
33.	<i>Sagephora joecularis</i> ♀	343

Except No. 11, all the figures are magnified. The approximate expanse of the wings is shown by a line beneath each figure.



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